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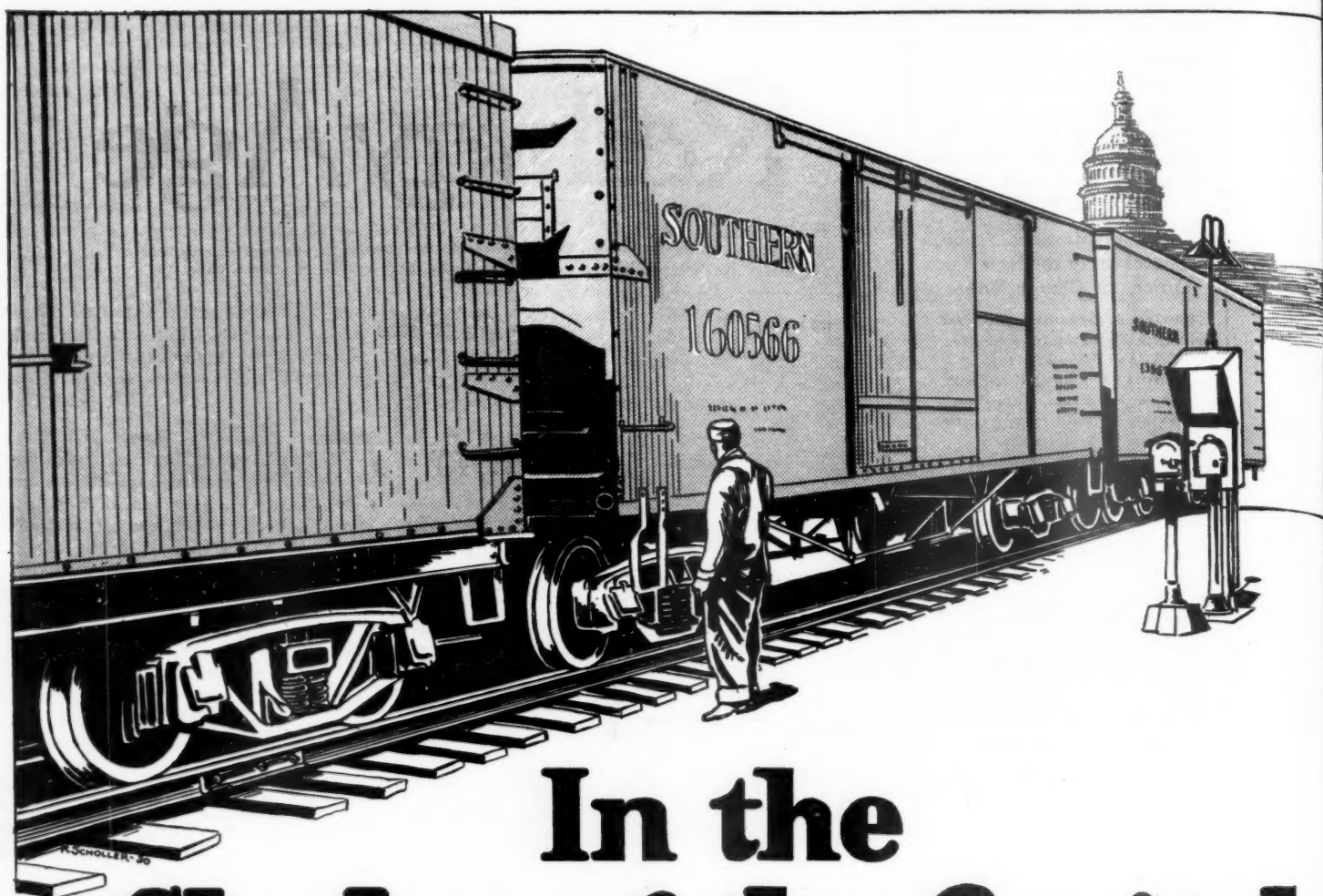
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In the Shadow of the Capitol

IN the shadow of the Nation's Capitol is located Potomac Yard of the Richmond, Fredericksburg and Potomac Railroad. Through this yard pass all the citrus fruit cargoes from the south and south east, cargoes which must be classified promptly so that they may be placed on the northern markets before spoilage occurs.

Five railroads deliver these cargoes to Potomac Yard. Sometimes as many as two thousand cars daily pass over the hump, and to sort quickly so many required a large force of riders which varied with the seasonal variations of the traffic.

"Union" Electro-Pneumatic Car Retarders

installed in Potomac Yard in February, 1930, are effectively classifying this heavy traffic of perishable freight.

Electro-pneumatic operation is the fastest known. And it is also the most flexible, for the pressure may be increased or decreased at the will of the operator.

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Railway Age

Vol. 89, No. 3

July 19, 1930

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Influences Affecting Railway Results

THE decisions of the Interstate Commerce Commission in the eastern and western class rate cases have given some encouragement to railway managements when encouragement was much needed. The decision in the eastern case apparently will result in a considerable increase of revenues. The effects of the decision in the western case will be smaller and are more uncertain. The western trunk lines probably need and are entitled to an advance in rates more than any other group of roads in the country. The maximum estimate of the advance for them sanctioned by the commission is about \$12,000,000 annually. This is much less than the railways concerned need and hoped for, and the size of the benefit that will be derived from it is as yet dependent upon what action may be taken by state commissions in regard to intra-state rates. The Interstate Commerce Commission could order the state rates advanced to a level with the proposed interstate rates, but has not done so. It seems reasonable to assume, however, that, unless the state commissions take appropriate action, the Interstate Commerce Commission finally will require the state rates to be brought into line with the interstate rates. In its decisions the commission conceded that the western trunk lines are not earning a fair return and repeatedly recognized the right of each group of railways to earn such a return, if rates reasonable in themselves can be made that will produce it.

Another development that gives encouragement is the report of Examiner Disque recommending that the Southern Pacific and its steamship lines be given fourth section relief which would permit them to make rates that will enable them to participate with the steamship lines in traffic between the Atlantic and Pacific coasts.

Reduced Earnings and Expenses

The issuance of these reports was almost contemporaneous with the issuance by the Bureau of Railway Economics of its report regarding the earnings and expenses of the Class I roads in May and in the first

five months of the year. This shows that the decline in net operating income in May was 33 per cent, as compared with 32.5 per cent in the first four months of the year, and that the return earned by the roads as a whole in the first five months was at the annual rate of 3.68 per cent as compared with 5.58 per cent in 1929. The figures regarding the return earned in May are not such as to inspire optimism, and some other figures may be cited which are even less apt to cause it. The percentages of decline in total earnings in the first five months of the year were as follows: January, 7.4; February, 10.1; March, 12.5; April, 12.3; May, 14. The reason for the success the railways have had in preventing the decline in their net operating income from becoming greater than it has while total earnings constantly have been showing an increasing decline is indicated by the following percentages of decline in operating expenses: January, 3.6; February, 5.7; March, 7; April, 7.6; May, 10.2. No one familiar with railway economics will believe that the decline in traffic has made possible this rapidly accelerating reduction of operating expenses. Undoubtedly it has been largely due to retrenchments in maintenance.

Recovery of General Business

A question much debated among business men and students of business at present is as to when the recovery of general business will begin. Many predicted it would commence in the second quarter of the year; but it did not. Many anticipated it would commence in the third quarter of the year; but railroad traffic does not as yet indicate that it has begun. However, the Harvard Economic Service has persistently predicted improvement in the second half of the year; and the boldest optimistic prognostication that has as yet appeared has been made by the "Business Week" in its issue for July 9. The "Business Week" predicts that "by the beginning of August a fairly definite and general upward turn in general business activity" will be evident, and that by October business will be "touching the normal line again." It presents eight definite reasons in support of its prophecy. These are: First, expanding bank credit.

Second, idle money seeking a job. Third, "bare shelves"—that is, reduced inventories resulting from consumption having for some months exceeded production. Fourth, sustained public buying power, as indicated by such facts as that dividend and interest payments have averaged 15 per cent higher than in the first half of 1929, and savings banks deposits have increased. Fifth, farm income prospects. Sixth, raw materials imports. Seventh, an upturn in residential building construction in May. Eighth, conditions indicating that automobile production will begin to show more than seasonal improvement in August.

Traffic Prospects and Train Service

There are various reasons for believing that the trend of railway traffic will be quite different throughout 1930 from what it was in 1929, and that it will begin to show an improvement in the last one-third of this year, whereas it declined in the last one-third of last year. Meantime, railway managements cannot fairly be criticized for curtailing operating expenses in every reasonable way; but it is by no means certain that at present they are availing themselves of all their opportunities to effect real economies. The commission in one of its recent rate opinions indicated that the carriers in western trunk line territory are being efficiently and economically operated; but it did intimate that this probably is not true as to "certain passenger operations." Is it true as to freight operations throughout the country? The average speed of freight trains in March and April was 13.8 miles, and in May 13.9 miles per hour. Of course, the increase in the average speed of trains has been going on throughout the last ten years, and it is easily possible to make higher average speeds when traffic is light than when it is heavy.

To what extent, however, is the continuing increase in the average speed of freight trains due to competition which is costing the railways money without actually resulting in benefits to general business? There has been little discussion of this question in public, but many railway officers do not hesitate to say privately that the speeding up of freight trains between large commercial and industrial centers is being carried too far. This is a matter which rival railways can deal with only by co-operation, and more co-operation and less competition in both passenger and freight service seems desirable under such business conditions as now exist.

It is essential to substantial improvement in railway net operating income that the railways shall get more traffic, that they shall be given more helpful regulation of their rates, and that they shall effect the largest economies in operation compatible with rendering the kind of service that business needs. The service being rendered by them is the best in history; but speed in freight service is not as important as dependability, and speed gained at the cost of unnecessarily light loading of trains can become very expensive.

Railways Being Saved By Operating Economies

COMPLETE statistics of earnings and expenses of Class I roads for the first five months of 1930 show that during that period they had gross earnings only 1.4 per cent greater than in 1921, and made the smallest percentage of return on their property investment that they have in any year since 1921, although they actually handled $31\frac{1}{3}$ per cent more freight business than in this part of 1921, and 26 per cent more than in 1922. The very small difference between gross earnings in the two depressed years 1921 and 1930, in spite of the much larger freight business handled in the latter year illustrates strikingly the effects upon earnings that have been produced during the last nine years by losses of passenger business and reductions of freight rates.

Excepting the difference in the volume of freight traffic, relatively the greatest difference thus far between the two years 1921 and 1930 has been that in operating expenses. In the first five months of 1930 operating expenses were \$245,000,000 less than in 1921, a decline of 12.3 per cent, in spite of the much larger freight business handled. Operating expenses in the first five months of 1930 were also 14.3 per cent less than in 1923; 9 per cent less than in 1924; 6.7 per cent less than in 1925; 9 per cent less than in 1926; 9.6 per cent less than in 1927; 5.2 per cent less than in 1928, and 6.9 per cent less than in 1929. Total earnings were 12.2 per cent less than in 1923; 6.7 per cent less than in 1924; 6 per cent less than in 1925; 9.8 per cent less than in 1926; 10.4 per cent less than in 1927; 6.7 per cent less than in 1928, and 11.4 per cent less than in 1929. Freight business was 5.2 per cent less than in 1923; 2.9 per cent greater than in 1924; almost 1 per cent greater than in 1925; 5.4 per cent less than in 1926; 9 per cent less than in 1927; 4.7 per cent less than in 1928, and 10.1 per cent less than in 1929. That the decline in total earnings since 1923 has been relatively much greater than the decline in freight business has been, of course, due to causes previously mentioned—namely, losses of passenger business and reductions of rates.

In the first five months of 1921, although total earnings were about the same as in the first five months of 1930, the railways earned net return at the annual rate of only about two per cent, and in the entire year 1921 net operating income was hardly sufficient to provide for total fixed charges. In the corresponding part of 1922 net return was earned at the annual rate of about 3.75 per cent, and in 1930 at the rate of 3.68 per cent.

The outstanding fact which all these figures make plain is that the railways are now being saved financially by the great increase in efficiency of operation which they have been making year after year, and which is now enabling them, in spite of the fact that they are paying the highest wages in history, excepting in 1920, to operate with an economy that otherwise would be wholly impossible.

Junking Obsolete Equipment Improvement of Highway Crossing Protection

TO what extent are obsolete and inefficient cars and locomotives kept in service beyond their useful life simply because the depreciation reserve has not yet been built up to their original cost? Answers will differ widely but some roads frankly admit that this situation obtains to an important degree. Junking these old cars and locomotives, unless the depreciation reserve has been built up to cover their cost, results normally in excessive charges to retirement and puts a heavy burden upon operating expenses when, in a time like the present, operating revenues are so low.

The only alternative to charging such retirements to operating expenses is to secure the permission of the Interstate Commerce Commission to charge them to Profit and Loss. This is a radical step, resulting as it does in a diminution of the corporate surplus account, the measure of the stockholders' equity over and above the par value of outstanding stock. On the other hand, getting down to realities, is it not the comparative costs which should govern? If it is costing more to maintain this old equipment than interest on the added investment plus maintenance cost of new equipment, then does not the Profit and Loss surplus become rather a stumbling block in the way of efficiency and become, in a measure, fictitious?

In other words, if it costs more to maintain old cars and locomotives than interest and maintenance costs on new equipment, does not efficient management require that the old equipment be retired whatever accounting procedure is necessary to describe the act? The junking of old equipment rather than its sale to second-hand dealers has been winning advocates among railroad men. One executive reports that old equipment brings higher prices as junk than when sold in working order and—what is quite important in slack times—provides work for railroad employees who might otherwise be idle. This same executive is also enthusiastic about the plan, because it permanently removes old equipment from any possible service, thereby permitting heavier trains to be moved at higher speeds without endangering safe operation. There can be no question but that the presence of old cars in a train is a definite limiting factor upon increased train loading and higher speed—two important characteristics of present-day railroading.

Each railroad must, of course, consider this problem in the light of its own situation—whether or not it actually is maintaining old equipment at a loss and whether or not either operating expenses or the Profit and Loss account could stand large retirement charges at the present time without affecting the confidence in railroad stability of the less observing. On the other hand, if the above considerations can be affirmatively answered, the plan appears most persuasive—holding forth, as it does, the promise of improved operating efficiency, greater safety and the provision of gainful employment at a time when that, in particular, is sorely needed.

AFTER some five years of controversy, standards for automatic highway-railroad crossing signals have been established by recognized associations of authority. In March, 1925, the Signal Section of the American Railway Association adopted a specification authorizing an aspect for a crossing signal that, when indicating the approach of a train, would present the "appearance of a horizontal swinging red light and/or disk". This included both the alternating-flashing red light and the wig-wag signals. In an effort to simplify the equipment, promote standardization, and secure more effective protection, the railroads and local governments have gradually swung over to the flashing light signal, and within the last year Canada, California, and Wisconsin, which formerly required wig-wag signals exclusively, have modified their regulations to permit the use of flashing lights. Only 522 wig-wags were installed in the United States and Canada during 1929, as compared with 1,979 flasher-light signals, and all but 259 of these wig-wags were installed on four roads west of Chicago.

About the time that the flashing-light signal gave promise of being adopted eventually as the one standard, it became evident that neither it nor the wig-wag was affording the desired protection in all cases. Observations at numerous crossings as well as investigations of accidents revealed the fact that some drivers did not know that a signal in operation indicated that a train was approaching, while others understood the indication, but, in the absence of definite instruction as to the action to be taken, took a chance and proceeded onto the crossing in advance of the train. To correct this situation, the Joint Committee on Highway Crossing Protection of the A.R.A. has recommended the addition of a "STOP" sign to the wig-wag and flashing types of signals, the details of which have been published previously in these columns. This recommendation has been approved also by the National Conference on Street and Highway Safety, and is, therefore, to be considered as representing the consensus of the best informed men on the problem.

The next step is for the railroads to avail themselves of the increased protection afforded by the additional stop sign recommended by the committee. Several roads, including the Wabash and the Grand Trunk Western, which have been using the illuminated stop sign on flashing-light signals for several years report very satisfactory results in the prevention of accidents. Certain states, including Wisconsin and Minnesota, require the use of the stop sign. Therefore, sufficient proof of the increased protection afforded is readily available. In view of the facts stated, it seems logical that all new signals should be equipped as recommended by the Joint Committee, and that such signs should be added to signals now in service.



The Control Machine at Stockton and Views of Signals at the Two Ends of a Passing Track

Centralized Traffic Control on the Southern Pacific

Estimated expenditure of \$2,500,000 for second track deferred by increased utilization of present facilities

BY installing a centralized traffic control system for directing train movements by signal indication on 37 miles of single track and 3 miles of double track between Stockton, Cal., and Brighton, the Southern Pacific has been able to postpone indefinitely the expenditure of \$2,500,000, the estimated cost of constructing a second track in this territory. This section was previously equipped with automatic block signals, but train delays were occasioned by the system of operating trains on time-table schedules with the train-order system superimposed to accommodate late trains and extras, and also by the necessity for stopping the trains while trainmen handled the switches at meeting points. The new centralized control system, including power switch machines for 11 sidings and the two ends of double track and signals for directing train movements, is all operated from a control panel in the office at Stockton. The system was placed in service in sections as completed, the last portion going into operation in April and, although the winter and spring traffic is much less than the October peak, the advantages to be gained are already apparent. Carefully studied comparisons with the old operation indicate that the average freight-train performance will be improved about 30 per cent. The flow of traffic over the section is also much smoother, due not only to the elimination of unnecessary stops but also to the avoidance of much interference between freight trains.

Characteristics of the Line

The line between Brighton and Stockton, which lies in the great central valley of California, is mostly level and tangent, the few light curves and grades not interfering with the normal operation of full-tonnage trains. Brighton is six miles from Sacramento, origi-

nally the western terminus of the first transcontinental railroad completed in 1869, beyond which point steamers operated via the Sacramento river and San Francisco bay. When the railroad was extended to San Francisco, the most logical route was south from Sacramento through Brighton to Stockton and Lathrop, thence west and north via Tracy, Niles and Alameda, a route of 140 miles, but one which avoided several deep water crossings. Later an 89-mile line was constructed from Sacramento to San Francisco via Port Costa, but this route includes a one-half-mile ferry crossing of an arm of San Francisco bay and, although the passenger service has been handled over this route, the greater portion of the through freight to and from San Francisco and the East and North has been moved over the longer route via Stockton. The \$12,000,000 Suisun Bay bridge now under construction will eliminate the car ferry.

Problem Occasioned by Peak Traffic

The passenger service over the Brighton to Stockton section includes one through and three local eastbound and one through and four local westbound trains daily.

The purpose of installing this centralized traffic control system was, to gain greater capacity and more expeditious handling of the heavy, fast perishable freight business during a peak season of several weeks in September and October. This subdivision not only handles much of the through east and west merchandise freight, destined for and originating in the San Francisco area, but also serves several large fruit and vegetable-growing sections of California, including the San Joaquin valley, which extends 300 miles southeast to Bakersfield, and smaller producing sections, such as the Santa Clara

and the Salinas valleys, which lie between the Coast range and the Pacific ocean. The heavy eastbound shipments of fruits and vegetables from these producing areas are routed over two different lines in the San Joaquin valley and over one line from the coast. The combined movement from these lines, as well as the freight from the San Francisco area, must be handled over the single-track section between Stockton and Brighton.

The Stockton-Brighton section is in itself a heavy originator of traffic and requires the services of as many as four switch engines during the fruit season. There are also from one to three trains of iced empty refrigerator cars moving south daily for local distribution to the fruit-shipping houses along the line during the season. Added to this is a considerable southbound movement of cannery fruit, sugar beets and market produce destined for the populous Bay district.

As empty refrigerator cars are returned from the east, they are cleaned and conditioned at Roseville by the Pacific Fruit Express and distributed from there to the entire northern and central parts of the state. They are usually pre-iced at the icing plant nearest the point of delivery. From 100 to 125 empty cars are handled in a train.

Eastbound perishable trains, usually consisting of 70 to 74 refrigerator cars and a locomotive of 3,000-ton rating, are assigned a symbol and serial number at the point of origin, by which they continue to be known until they reach their eastern destination. These trains are run to Roseville by the Stockton division, many of them picking up odd fruit loads on the way as occasion requires. At Roseville, all refrigerators are re-iced and the trains are powered for the two-per cent grade to the Sierra Nevada summit at an elevation of 6,884 ft.

Basis for Study

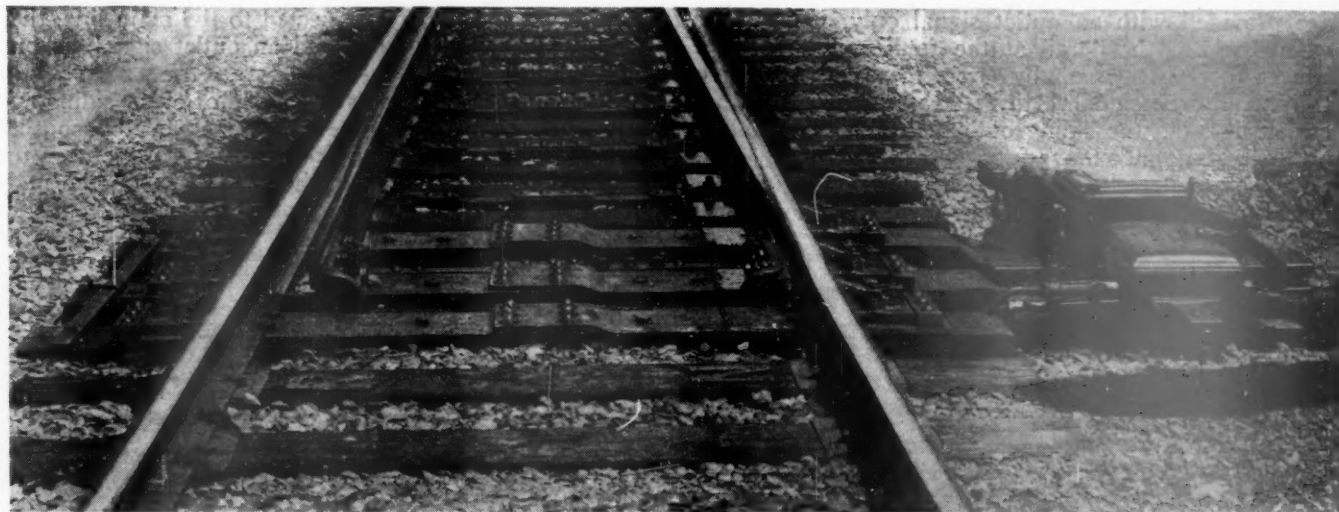
The growth of perishable traffic has been so rapid that in 1926 serious consideration was given to second tracking this line at a cost of about \$2,500,000, as there were peak days when as many as 46 train movements were handled, with a sharp daily peak to make matters worse, besides numerous main-line switch-engine movements. Before making such a large expenditure, an analytical study was made to determine what relief could be obtained by the centralized control system, in which the siding switches would be electrically operated from a central point, such as the dispatcher's office

at Stockton, and trains governed by signal indications only, superseding train orders and all train rights, whether of class, direction or schedule. The two objectives of this study were (1) to ascertain the operating economies that could be effected, since the savings to be effected must be more than sufficient to cover the interest and maintenance charges on the added facilities and (2) to estimate the increased traffic capacity, since, with a given rate of growth, this increase will determine the number of years available to amortize the investment.

Traffic varied from a minimum of 9 freight and 9 passenger to 37 freight and 9 passenger trains a day. That is, there were more than four times as many freight trains on September 24, 1927, as on January 9, 1927. The traffic fluctuation is illustrated in the accompanying diagram, which shows the weekly gross ton-mile production for the entire Tracy-Roseville subdivision of which the Stockton-Brighton proportion is about two-thirds. With this fluctuation, it was obvious that the economic aspect could be obtained only by a complete study of the traffic of an entire year, since it was evident that it would be impossible to choose any "average days." It was equally obvious that the increase in traffic capacity could be predicated only on the comparatively short October peak.

The plan of this study consisted of choosing from a 12-month period a considerable number of representative days, varying in freight density from the lowest to the highest. Records of all trains which were run on these days were obtained from the train sheets, conductors' reports and train-order books. The delays were carefully analyzed, and the trains were then "re-dispatched" on charts as they would have been operated with the centralized traffic control system. Redispersing was done without increasing the moving speed of trains, and the train time saved was only that portion of the time originally lost at sidings, which could have been saved by centralized control. In this way, a formula was obtained by which the mean savings for any day or period could be calculated for its traffic density.

Although extremely conservative, the study indicated that centralized control would have saved, for the test year shown in the diagram, no less than 3,123 freight-train road-hours and 10,153 stops for the 6,809 freight trains operated in that 12-month period. About 1,120 of the hours saved were on overtime. The economies included \$7,246 in crew overtime, \$10,520 in station personnel, \$9,200 for fuel oil, \$8,328 on per diem and



Heavy Gage Plates and Rail Braces Feature the Power Switch Layouts

car rental, and \$11,700 on the 2.6 fewer locomotives which would have handled the same business under the new system.

Centralized Traffic Control System

The primary function of the centralized control system is to reduce road time by advancing inferior trains to points of natural meeting or passing of superior trains, instead of having them lose time by taking siding prematurely and also to provide for centralized selection of meeting points so as to prevent sawing and other interference between trains.

With the new centralized control system, the passing track and end-of-double-track switches are power-operated by electric switch machines, and all train movements are directed by signals which are located at the proper clearance points. Special study was made to anticipate and provide fully for the new conditions of train operation and several novel features have been incorporated in the system. For instance, it is desir-

able in both directions. When either the switch or derail is reversed, the outlet signal shows red and main-line signals in both directions are held at stop; and when both are reversed, the dwarf signal shows green, yellow or red to indicate "Proceed" (either direction), "Proceed Prepared to Stop at Next Signal" (either direction) or "Stop." The signal is, therefore, more than a switch indicator and is comparable with a "Leave-Siding" signal giving complete automatic protection to trains on main and yard tracks.

Just east of Lodi, a considerable group of such yard tracks are used constantly during the fruit shipping season for switching empty and loaded refrigerator cars in and out of the various spur tracks and for assembling trains on the makeup track. It is necessary to permit the maximum use of main tracks by the switchers. To accomplish this, the first two signals east of Lodi are controlled by the dispatcher who can advance trains up to the congested block from both directions, while the switching crews are permitted to use the main track until the last minute.

Another special case has to do with the short stretches of double track from El Pinal to Akers and the Sacramento division extension from Elvas interlocking to Brighton. On the former stretch, both tracks will be equipped with either-direction signaling, which will permit of the utilization of either track as a siding for passing a fast train around one, two or even three slower trains, a very valuable feature because the double track for several miles west of El Pinal is within yard limits. All of the passenger trains and some of the freight trains passing through Brighton run into Sacramento. By signaling the westbound (upper) track for either direction, eastbound trains can run from Brighton to Elvas on the westbound track when the eastbound track is blocked, as is frequently the case.

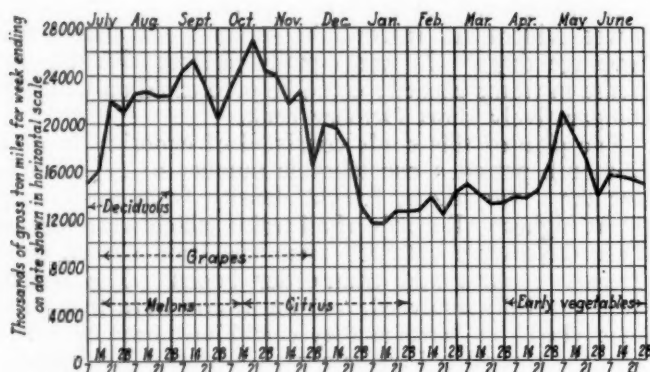


Chart Showing Variation in Traffic

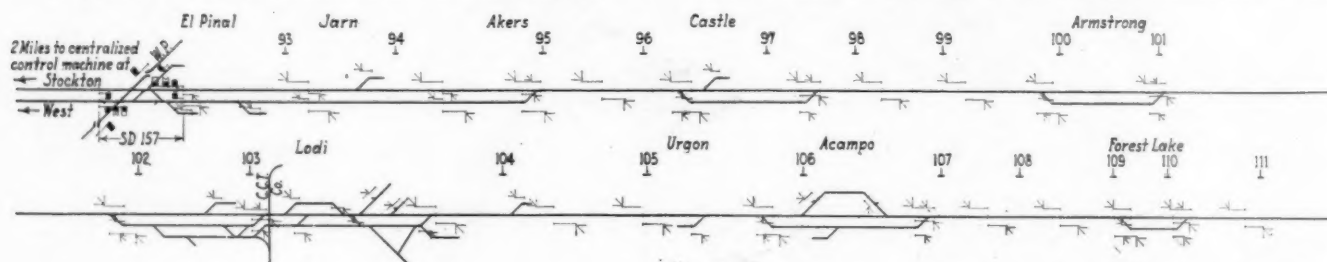
able to permit a speed of 25 m.p.h. into and through sidings when conditions permit this with safety. Therefore, the signaling is so arranged that a green diverging facing-point signal is displayed if a siding is unoccupied, but only a yellow signal if the siding is occupied by a train which entered the siding from the same end. The same signal will always display red if the opposing signal is clear or if the siding is occupied by a train which entered from the opposite end. For this purpose, the sidings are provided with track circuits which are used also for the control of highway crossing signals.

Yard tracks and spurs, connecting with the main line, are provided with an outlet signal only, which is located back of the derail at the fouling point and arranged for observation by enginemen rather than by trainmen. The signal, a three-lens light-type to differentiate it from the siding outlet searchlight signals, is normally dark. To move from a yard track to the main line, a trainman obtains oral telephone authority from the dispatcher, who protects the move with stop signals

Sidings Lengthened to 125-Car Capacity

Previously the sidings varied from 80 to 100-car capacity and there was a lack of adequate switching facilities, especially at Lodi, Elk Grove and Florin that seriously affected train operation. It was decided to lengthen all sidings uniformly to 125 cars, to provide a makeup track for fruit trains at Lodi and to rearrange the tracks at Elk Grove and Florin. The cost of these track changes amounted to considerably more than half of the total improvement. Wherever possible, the industry and house tracks are so arranged that switching will not foul the main line, which would interfere with the smooth operation of the centralized control system. Where such spurs are connected to the main line, they are protected by a derail and an outlet signal, as previously described.

A telephone is located at each end of every siding and at each outlying main-line yard track switch so that crews can always communicate with the dispatcher for instructions or to obtain rights to switch on the main line. These telephones are normally connected to the



Track and Signal Plan of Centralized El Pinal

dispatcher's circuit but can be thrown to one of the other division circuits when necessary.

Control of Each Station Unit

Each of the 22 siding and the 2 end-of-double-track switches is provided with an electric switch machine, suitable signals for governing train movements over it, and a track circuit including the complete fouling limits of the switch and leads. Such a group is known as a "field station." The track circuit, besides having the usual function of switch locking and signal control, is used for an automatic "OS," to be described later, and is, therefore, usually termed the "OS track circuit."

Each field station is reproduced on the control board in the division dispatcher's office at Stockton, two miles west of El Pinal, the westerly end of the control system. Each panel of this board consists of a section of the track diagram representing one switch, a two-position switch lever, a three-position signal lever, a starting button and a pen on an automatic graph, arranged in that order from top to bottom. Each panel also includes a luminous track indicator to repeat the condition of occupancy of the "OS" track circuit and similar indicators to repeat the position of the switch and the signals.

The control of traffic, together with all needed information for governing train movements, is thus centralized at this board, and any switch or signal, within the usual restrictions of safe signaling practice, can be operated by the dispatcher at any time. Changes in the position of switches and signals and the returned indications of their position are effected by the Union Switch & Signal Company's two-wire code relay system by coding the current in a line circuit, that is, by interrupting the circuit to give a number of current combinations or codes which are selectively received and translated into operation or indication of the component parts of the system.

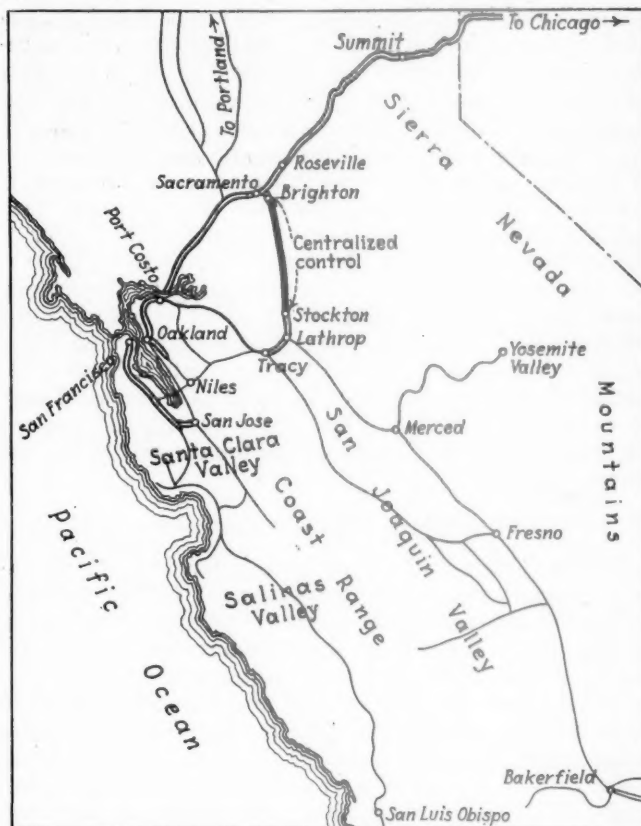
Automatic Train Graph

The location and progress of trains are indicated visually by the "OS" track diagram indicators and are also permanently recorded automatically on a train graph which is located in a compartment below the level of the desk at the bottom of the control panels. It consists of a roll of specially-ruled paper, 16.5 in. wide, operated by a clock mechanism at three inches per hour, on which rest 24 recording pens, one for each "OS" point. When a train enters an "OS" track circuit the corresponding pen moves a short distance to the right, returning when the train leaves. A glass cover over this train graph can be slid down to permit the dispatcher to make desired notations, such as the train designation, consist, weight, crew, and causes of delays; and to connect up the automatic record to form a graphic train sheet which then constitutes a record of the time that each train enters and leaves each "OS" track circuit. The train graph as a whole provides about ten times as

many train-time data for the dispatcher as are available under the previous train-order system. While the train chart is a continuous roll, it is the practice to tear it off daily at the midnight line and to file it in lieu of dispatcher's train sheets, which are no longer used for this section of line.

Operation of Control System

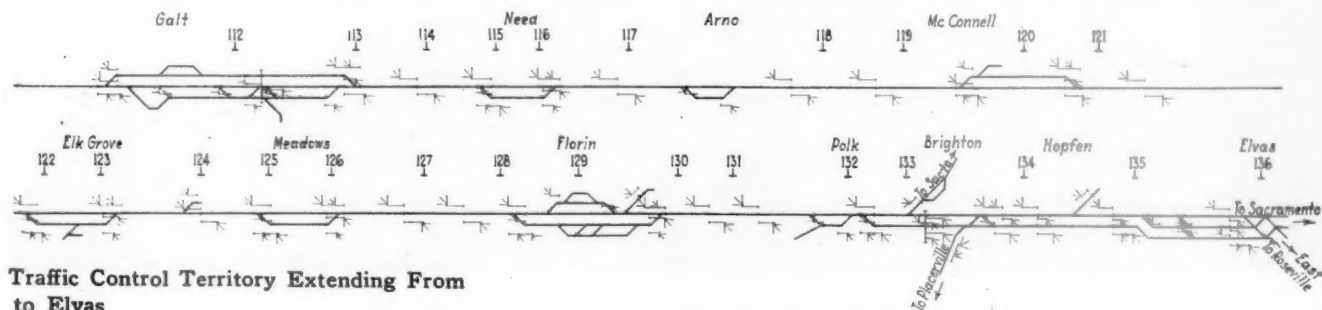
To change the position of a track switch or a signal, the corresponding control levers are moved to the desired position and the push button is operated, causing the generation of a code in the line circuit, consisting



Map of Territory Served By Installation

of a series of circuit interruptions therein. When the field station units have responded completely to the outgoing control code, a code of similar nature is transmitted from the field station to the control panel and causes the lights to indicate the new positions. If the levers are not moved, the pressing of the starting button enables the dispatcher to verify the indications without operating the field station units. Each code requires about six seconds to complete, so that the several starting buttons may be operated in rapid succession and the codes will be sent out consecutively.

Normally two of the indication lamps are lighted, a



Traffic Control Territory Extending From to Elvas

yellow one for indicating the switch position and a red or green lamp showing whether the wayside signal is at stop or proceed. If the "OS" track circuit is occupied, the corresponding red bulls-eye is lighted instead of the red signal repeating lamp.

For switching moves, manual operation of the power switch is provided by the dual-selector switch machine. When a crew wishes to switch over one of the controlled switches, telephone permission is secured from the dispatcher who will authorize a time limit, based on approaching trains. The trainman then moves the selector lever, which is normally held in the "Motor" position by a standard switch padlock, to the "Hand Throw" position. The switch points may then be operated by hand, independent of the dispatcher. The reversal of the "Selector" lever causes the approach signals to indicate stop and, in addition, the dispatcher transmits a "Stop" signal code before giving the authority. The dual-control switch machine may also be used in case of failure of the switch machine. The switch may then be thrown by hand at the request of the dispatcher. Signal circuits are so arranged that after a switch has been reversed by hand the governing signals may be cleared if a code corresponding to the switch position is received at the field station. This not only reduces the time lost by trains under such a condition, but avoids the necessity of flagging the first block and, during the heavy-traffic season, the time thus saved will be extremely valuable. During the reversal of the selector lever, the "OS" indicator at the dispatcher's office shows red.

Complete Electric Locking

In this system, each field station is considered a miniature interlocking and the equivalent of full modern interlocking protection and facilities are provided, such as means for preventing simultaneous clearing of opposing signals, locking between switches and signals, approach locking and informatory indications of the positions of switches, signals and trains. The approach-locking in this system not only prevents a switch from being thrown ahead of an approaching train, but also performs the novel function of preventing the clearing of an opposing controlled signal where no automatics intervene. In the single-track stretches, which are all divided into two or more blocks, the clearing of a sig-

nal governing train movements into them sets all opposing signals at stop.

Special Switch Construction

When lengthening the passing sidings, the turnouts for the sidings as well as for the two ends of double track at Akers and Brighton were replaced with new No. 14 turnouts constructed of 110-lb. rail. The side tracks themselves were brought up to secondary main-line standards, with new creosoted ties and 90-lb. rails, to permit train speeds of 25 miles per hour.

Special study was given to the design of the electric switch layout. Creosoted ties were used and, as it is a positive rule of the Southern Pacific not to cut treated timbers, the switch layout was drawn up in complete detail for both left- and right-hand layouts. The ties were then framed and drilled before being creosoted. The three insulated gage plates, which are $\frac{3}{4}$ in. thick and 9 in. wide, were also designed and fabricated in advance, including the riveting of the riser plates and rail-brace butt plates. This is quite an improvement over the previous method of assembling these gage plates by hand in the field and fitting each to one particular switch. By the new plan, the ties, gage plates, points, and rods were all installed by the track gangs in one operation, leaving only the electric switch mechanism to be bolted in its place by the signal construction forces.

New Signals Throughout

All of the old signals in this installation were renewed, the Style-B automatics which had given service since 1903 being transferred to other districts and re-installed. The new signals consist of 52 one-arm, three-position, searchlight-type automatic signals; 24 one-arm, three-position, searchlight dispatcher-controlled high signals; 24 two-arm, three-position, searchlight-controlled dwarf signals and 29 three-light dwarf signals at yard track exits.

The economic study was made by the Union Switch & Signal Company which also furnished all the switch machines, signals, relays, and switch circuit controllers, together with the control panel and all code equipment. The installation was made by the signal department of the Southern Pacific under the supervision of W. E. Boland, signal engineer.

* * * *



The "Flying Yankee" on the Boston & Maine at Reading, Mass.



The Terminal Commerce Building as it Appears at This Time

Reading Builds Huge Commercial Building at Philadelphia, Pa.

*New structure, with 30 acres of floor space, designed primarily for office and warehouse purposes—
Freight terminal in basement*

By Clark Dillenbeck

Chief Engineer, Reading Company

THE Reading is now completing one of the largest and most modern rail terminal warehouses in the country, at Philadelphia, Pa., the striking features of which are not alone its size, 12 stories high and covering an area of 118,700 sq. ft., housing a freight terminal, warehouse floors and a large amount of office space, but also the fact that it is located in the heart of the city on the city's most prominent street. When completed early this fall, shippers over the Reading may have their offices, warehouse areas, assembling plants, etc., all in the same building, in the main business district, with elevator connection to a modern freight station.

Building Occupies Old Freighthouse Site

The new building, which is among the largest reinforced concrete buildings in the country, and which, at the same time, employs steel girders of unprecedented size in building construction at its second and third floor levels, is called the Terminal Commerce building and fronts on South Broad street, four blocks from the city hall in the business center of Philadelphia. It occupies the entire city block bounded by Broad street on the west, Thirteenth street on the east, Callowhill street on the south and Noble street on the north, except for a portion along the north side of the block, occupied by two main tracks of the Reading at subway level.

The site of the new structure was occupied previously by local freight facilities of the Reading, which included, primarily, two freighthouses 35 ft. wide by 525 ft. long, served by seven receiving and delivery tracks. These tracks approached the site from the west, under Broad street, which is carried on a bridge, and ended at Thirteenth street. The two through freight tracks along the north side of the site also extended under Broad street, but continued to a bridge over Thirteenth street.

During the first stage of construction, the northerly freighthouse was abandoned and removed by the contractor, who then proceeded with the construction of the north half of the new building. When this portion of the building was up to the third floor level and a part of the new freight platform at the track level had been completed, the freight business was transferred to it and the contractor proceeded to remove the southerly freighthouse and to complete the foundations for the remaining part of the building. The work on the south half of the building was then pushed until this half was brought up to the height of the north half and the entire building was then carried up uniformly. While the programing of the work so as not to interfere with the usual handling of freight caused a serious problem in construction, by co-operation between the railroad and the contractor all of the work has been carried out suc-

cessfully, not only without serious interference with the freight business but without causing any serious delay to the contractor.

Building Has 30 Acres of Floor Space

The new Terminal Commerce building, with 1,302,000 sq. ft. of floor area, is of fireproof construction throughout. From the track level to the third floor level it is constructed of structural steel, fireproofed with stone concrete, and has monolithic floors. Above the third floor level, the building is of flat slab reinforced concrete construction.

The front or head section of the building, facing on Broad street, is 154 ft. deep and is designed especially for office and show-room purposes. In this section the second floor has been omitted to give a first floor ceiling height of 25 ft., and provision has been made for hanging a mezzanine floor on all four walls. A bank will occupy the southwest corner of the main floor, while the remainder of this floor will prove unusually attractive for show space.

The higher floors of the front section of the building all have clear headroom of 12 ft. and may be used for offices, show rooms, or warehouse space, as desired. In fact, a large amount of the floor area in this section has already been leased for these purposes.

The rear, or warehouse section, of the building is a solid unit to the sixth floor, above which a light well extends longitudinally through the center. This portion of the building was designed mainly for warehouse purposes, but large portions have already been leased and have been laid out and finished for offices, show rooms, receiving and shipping rooms, assembly shops and light manufacturing and repair plants, as well as for warehouse areas. To a large extent the interior finishing of the building has been left incomplete so that each portion, as leased, can be finished to meet the requirements and desires of the tenants.

The first floor rear of the building, which will be used mainly as a warehouse and for receiving and shipping purposes, is served by a 64-ft. driveway, extending from Broad street to Thirteenth street, through the north side of the building. The second floor, which extends

only through the rear section of the building, will be used exclusively for a garage. This floor provides sufficient area for the parking of about 500 cars, in addition to space for washing racks and a gasoline pumping station.

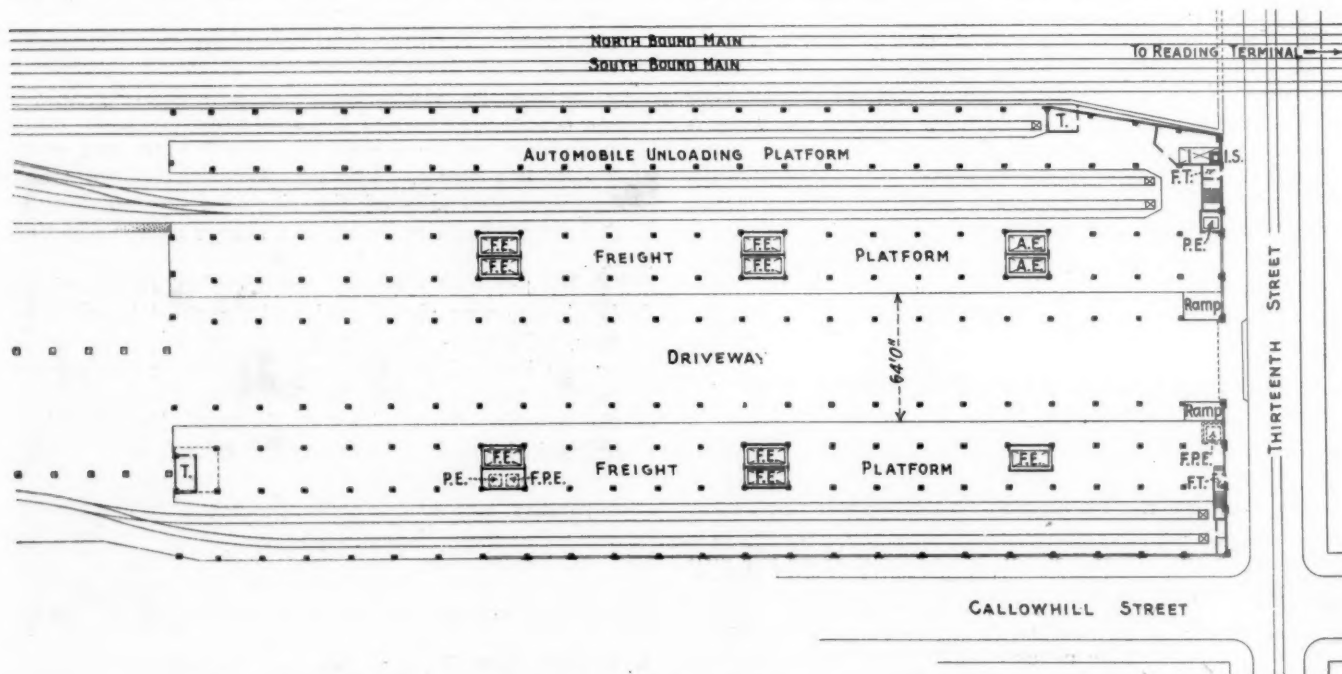
Access for autos to the second floor is by means of a ramp on a 10 per cent grade along the north side of the building, just outside the first floor driveway. This ramp, which leads from the street level on Broad street, is hung from the side of the building, over the main tracks along this side of the building.

The basement level of the building is occupied solely by the rearranged freight facilities of the Reading, which now consist of five stub-end tracks with a total capacity of 60 cars, three platforms, 41 ft., 37 ft. and 15½ ft. wide, respectively, and all 500 ft. in length, and a 64-ft. paved driveway. This driveway, which extends between the two main platforms throughout the length of the building, leads directly from Thirteenth street. It is also made accessible from Fifteenth street, two blocks west of Thirteenth street, by means of an existing driveway between Fifteenth street and Broad street, which passes under the Broad Street bridge.

Elevator Facilities

All floors within the building, including the platforms at the track level, are served by heavy-duty freight elevators, there being ten such elevators, each with a capacity of 10,000 lb., spaced throughout the building. The cars of these elevators are 8 ft. 4 in. wide by 20 ft. 6 in. long, and the elevator speed is 150 ft. a min. In addition to these elevators, there are four passenger elevators which run the full height of the building, and provision has been made for installing four additional elevators at any time in the future that it may be found necessary.

Two of the present passenger elevators serve the front or office portion of the building, while the other two are located in diagonally opposite corners of the warehouse section. The four possible future elevators are distributed in the same manner. The passenger elevators in the office section of the building travel at a speed of 600 ft. a min., while those in the warehouse



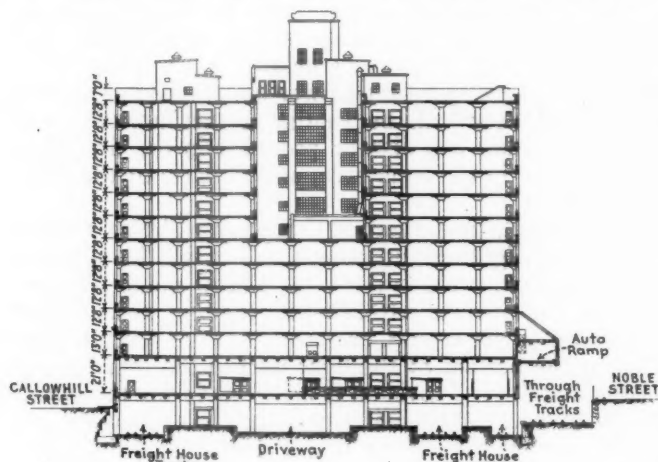
Plan of the Building at the Track Level Showing Arrangement of Freight Platforms

section have a speed of 500 ft. a min. Supplementing the elevator service, and for use primarily in case of emergency, there are five fire towers, these being located along the south and east sides of the building.

Building is Unusually Attractive

Owing to its location, the exterior of the new building has been given unusually pleasing architectural treatment, this being along modernistic lines. The Broad street corners are stepped back at the eleventh floor, and in the center of the Broad street front is a tower, rising 41 ft. above the roof level. In this tower are housed water tanks for general water supply and for the automatic sprinkler system, with which the building is equipped throughout.

The store and show room fronts on Broad street are framed in cast iron, finished in colors, while the main entrance, in the center of the building, is framed in colored terra cotta. This same material is also used for decorative purposes on the tower and around the top story of the office section. Otherwise, the front section of the building is faced with light brown unglazed terra cotta to the third floor level, with buff Kitanning brick above. This brick facing is carried over all concrete columns and girders in the outside walls so



A Typical Section Through the Broad Street End of the Building

that no concrete is exposed. The exterior curtain walls between columns are backed with terra cotta tile, 12 in. by 12 in., and 8 in. thick, making the total thickness of the curtain walls 12½ in. The backing tile used in the warehouse sections is smooth faced, while that used in the office section has a scored face in order to permit a plaster finish directly over it.

Interior partitions in the warehouse are of smooth-faced hollow tile, unplastered, while partitions in the office section are of gypsum block with a plaster finish. All doors and windows throughout the building are of steel construction, the windows in the front section having double-hung sash while those in the warehouse section are of the industrial type with two lines of projected ventilating sash on each floor.

Interesting Features in Construction

Two distinct types of construction were employed in the building, steel up to and including the third floor level in the office section and the second floor level in the warehouse, and reinforced concrete above these levels. This was made necessary because of the height of the building and the unusually wide column spacing



View Taken During Construction, Showing the Unusually Pleasing Architectural Treatment Accorded the Front of the Building

required on the track level and first floor to afford the proper location of tracks, platforms and driveways, which put such heavy loads on the lower columns as would have made them of prohibitive size if they had been of concrete.

There are nine rows of columns on the track level and first floor of the warehouse section, spaced from 21 ft. to 42½ ft. center to center transverse to the building, while there are only seven rows of columns in the first floor front, spaced across the building on 30-ft to 42½-ft. centers. All columns are spaced on 22-ft. centers longitudinally through the building.

The foundation footings of the building, of which there are 228, are of concrete carried down in steel caissons to soft rock, and then through the soft rock to bed rock. The different footings vary in depth from 13 ft. to 50 ft., and in diameter from 3 ft. to 7 ft., and are battered out at the bottom at an angle of 60 deg. to keep the footing loading within the allowable bearing pressure of 18 tons per sq. ft. on the rock.

Spiral and vertical reinforcing were used in the cap sections of the footings and the column loads were transferred to the footings caps through billet steel plates varying from four inches to seven inches in thick-



A Typical View Through One of the Spacious Floors in the Building

ness. The maximum load on any of the footings was 3,913,000 lb.

On all of the floors above the first there are 12 rows of columns, spaced from 17 ft. to 21 ft. transverse to the building. Owing to this closer spacing of columns on the upper floors, it was necessary to carry six lines of columns on heavy plate girders at the third floor level of the office section, and four lines of columns on girders at the second floor level throughout the warehouse section. Altogether there are 72 columns with loads concentrated on girders.

Girders are also used at the first floor level throughout the building but these are required to carry only the floor load. In the case of the girders carrying the column loads, it was necessary to employ twin girders in order to preserve the required head room. The heaviest of these girders used have 69-in. webs and 18-in. cover plates. The heaviest steel columns used are built-up H-sections, having 16 $\frac{3}{4}$ -in. by 3-1/16-in. flanges and a web 2 in. in thickness. To these massive sections are added 24-in. by 3 $\frac{1}{4}$ -in. flange plates, which results, in all probability, in the heaviest steel construction ever placed in a building. The structural steel framing up to and including the third floor required 7,611 tons of steel.

Flat slab concrete construction of the mushroom type is used above the third floor in the office section and above the second floor in the warehouse section, except that in order to keep the diameters of the columns down to a desired minimum, cores of steel H-beams were used in all columns to the seventh floor in the warehouse section and to the ninth floor in the front section.

The building was designed for a floor load of 200 lb. to the sq. ft. on the first four floors of the warehouse and the first floor of the office section. The first floor rear and the driveway leading to it are reinforced to carry the trucking to which they will be subjected. All other floors are designed for a loading of 150 lb. per sq. ft. All of the floors are provided with a monolithic finish with an iron hardener. The first, second and third floors are 4 in. to 5 $\frac{3}{4}$ in. thick; the fourth floor is 8 in. thick, and the floors above the fourth are 7 $\frac{1}{4}$ in. thick. The roof is likewise of flat slab construction, and is 6 in. thick, with Johns Manville built-up asphalt roofing, insulated with two one-half in. layers of Celotex.

Large Amount of Materials Used

All of the concrete used in the building has been prepared in a central mixing plant, located as near the center of the building as was possible. The aggregates used were dumped from cars at the track level directly into bins built beneath the track. From these bins the stone and sand were carried to a one-yard mixer by chain bucket conveyors. All materials were measured in an inundator plant. After mixing, the concrete was dumped into a one-yard skip-hoist bucket, and was carried to the working level where it was dumped into a hopper from which it was run into two-wheel buggies and wheeled over runways to the point where it was to be deposited.

The cement was tested at the mills, where it was kept in sealed bins and shipped as required. Therefore, there was no necessity for storing the cement at the job, where space was limited, and the cement was unloaded from the cars directly at the mixer. Owing to the large amount of cement used and the lack of available space, it was impossible to follow the usual practice of testing the cement after delivery and waiting for the results of such tests before using the cement. The

proportions of cement, sand and stone used in making the different classes of concrete were as follows: For foundations, 1-1-2; for pedestals, 1-1 $\frac{1}{2}$ -3; for reinforced concrete generally, 1-2 $\frac{1}{2}$ -3 $\frac{1}{2}$, and for a small amount of plain concrete, 1-3-5. Altogether, approximately 49,200 cu. yd. of concrete was used in the building, requiring 92,000 bbl. of cement. In addition, 9,781 tons of structural steel and 2,700 tons of reinforcing steel were used. Also, an equivalent of 4,150,000 brick was employed in the building, there being 1,500,000 face brick and the balance in hollow tile backing. There are 150,000 sq. ft. of interior tile partitions, and about 19,000 sq. ft. of ornamental terra cotta in the face work.

The building will be heated with steam furnished by the Philadelphia Electric Company from its central plant about three blocks away. The steam will be supplied through a new 16-in. main which has been laid from the plant to the outside of the building at Thirteenth and Callowhill streets. The initial steam pressure in the new main will be 200 lb., but this will be reduced to 45 lb. at an 8-in. service connection at the building. The heating system is of the vacuum type with an initial steam pressure of 5 lb. and a vacuum of 10 in. of mercury on the return system. Thermostatic control valves will be placed on all radiators.

Most of the heating will be done by direct radiation, the principal exception being on the second floor and on a part of the first floor trucking space, where heating will be done by heater-blower units. The garage on the second floor will be ventilated mechanically, and such ventilation will also be provided in the first floor show rooms, in the bank area, and in parts of the office space.

The Philadelphia Electric Company will also furnish current for lighting and power. This will be supplied as 3-phase, 60-cycle current, at 13,200 volts. Transformers to provide 110-220-volt lighting circuits and a 440-volt power circuit, are located at the seventh floor level at the bottom of the light well in the rear section of the building. Provision is being made for the installation of such additional transformers as may be required to take care of the power demands of the building's tenants.

With the completion of the Terminal Commerce building, which will not be formally opened until early this fall, in spite of the fact that certain tenants are moving in at the present time, it will be possible for a tenant to house his entire organization, including office force, display rooms, warehouse area, assembling and light manufacturing plant and receiving and shipping departments, all on a single floor, with the additional advantage of being within elevator connection with a modern freight terminal for receiving and dispatching shipments, thereby avoiding all cartage charges. At the same time he is afforded the best of facilities for making local deliveries or for receiving shipments by trucks.

The Terminal Commerce Building has been built under contract with William Steele & Sons Company, Philadelphia, the contract including the furnishing of all plans and detailed drawings as well as the actual construction work. The entire project has been planned and constructed under the direction and supervision of the writer, assisted by members of his staff, including C. L. Wenkenbach, engineer of building; Percival S. Baker, engineer of bridges; W. K. Wyatt, construction engineer, and A. T. Erickson, inspector. The building will be operated by the Terminal Commerce Building, Inc., a new subsidiary of the Terminal Warehouse Company, with E. V. Sullivan, president of the new company, in charge.



Baltimore & Ohio 50-ton Box Car Equipped with the Duryea Cushion Underframe

The Duryea Cushion Underframe

*Baltimore & Ohio adopts novel underframe construction
as standard for new freight cars—Nearly
10,000 cars in operation*

AN underframe construction in which the shock-cushioning and draft functions have been completely separated has been adopted as standard by the Baltimore & Ohio. This underframe construction, which was developed by the O. C. Duryea Corporation, 230 Park avenue, New York, was demonstrated before representatives of the Baltimore & Ohio in December, 1927, at the Butler, Pa., plant of the Standard Steel Car Company. The experience with cars equipped with the Duryea underframe since that time resulted in the railroad adopting that construction as standard for new freight equipment, and, at the present time, the railroad has 9,601 cars equipped with this underframe now in service. Of this number, 5,500 are 50-ton box cars, 2,000 are 70-ton hoppers and 2,000 70-ton gondola cars. This railroad also has in service 100 express cars equipped with the Duryea cushion underframe and a caboose under construction.

In addition to the cars in service on the Baltimore & Ohio, experimental installations have been made, or are in the process of construction, on five other railroads and on the equipment of four private car owners.

Purpose of the Duryea Design

With the rigid limitations imposed on draft-gear travel in order that slack action may be controlled within practicable limits, increased energy absorption can only be produced with an accompanying increase in end force. The capacity within the range of desirable end force is, therefore, strictly limited. The purpose behind the design of the Duryea structure is to permit the control of the slack and of energy absorption capac-

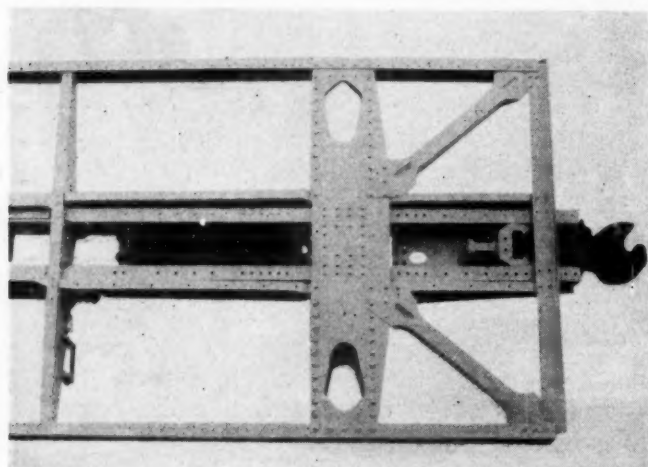
ity, each to meet the most desirable operating conditions, without the necessity of a compromise between them.

The principle involved in the Duryea underframe is the application of a center-sill member mounted and guided within the cross-bearers and bolsters of the underframe, but free to move longitudinally, and connected to the underframe and car body through two cushion gears located between the sills behind the bolsters. The center-sill member in effect forms a rigid draft and buffing column, in the ends of which the couplers and coupler gears are secured. The cushion gears may be designed with a variety of characteristics as to maximum travel, capacity and energy absorption without affecting the amount of slack movement between adjoining cars. The coupler gear embodies a spring of small capacity, having a travel of one inch which serves to keep the coupler normally against stops in its most extended position, so that there is no slack between the cars in draft except that between the coupler knuckles. This provides for a slack movement of 2 in. between adjoining cars in buffing to permit the accumulation of sufficient slack to facilitate starting trains.

The Underframe Construction

The Duryea underframe consists essentially of the bolsters, side sills and cross-bearers which are riveted to the side sills and to a series of longitudinal members, adjacent to the longitudinally movable center sills, which are riveted between the various cross-members. With the exception of the torque arms, these members are of relatively light construction. The longitudinal

members, which extend back from the bolsters to the adjoining cross-bearers, serve as torque arms to resist the tendency of the bolster, slidably mounted on the center sills, to tip under the moment exerted by the truck at the center plate in braking. Each of these



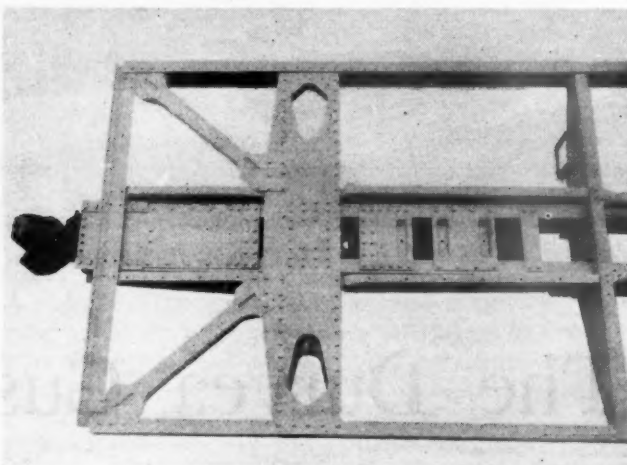
Design of Duryea Underframe as Originally Applied to the Baltimore & Ohio 50-Ton Box Cars—Cover Plates Are Removed to Show the Cushion and Draft Gears

members is of deep section where it is built into the bolster and tapers upward toward the end which is riveted to the cross-bearer.

The center sills used in the construction of the Baltimore & Ohio 50-ton box cars and 70-ton hopper cars are 10-in., 41.1-lb. modified shipbuilding channels. Between the ends of the sills and the bolster, these channels are secured together with top and bottom cover plates which extend to within a gaged distance of 7 in. from stop faces on the body bolster. The bolster ends of these plates are reinforced with short plates which serve as stops to limit the inner movement of the center sills toward the bolsters. Similar top and

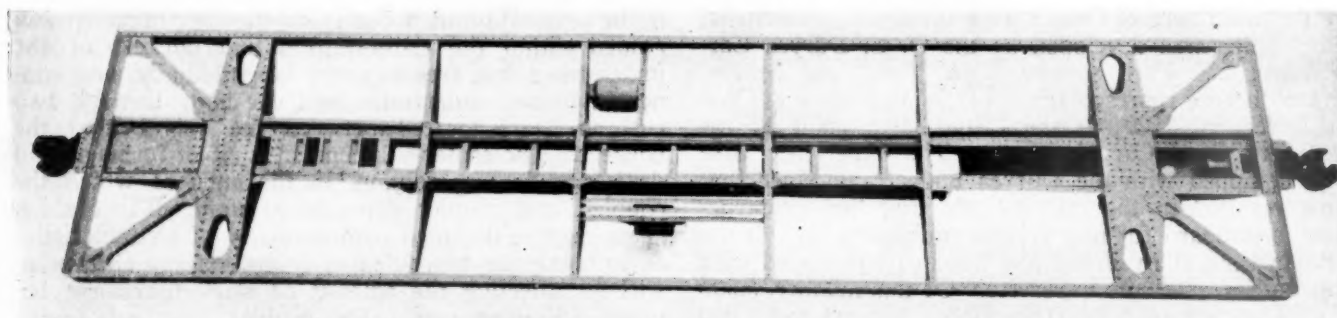
diaphragms, a center-brace casting framed to receive the center sills, and top and bottom cover plates. The torque arms, which are also flanged pressings, extend through the entire width of the bolster structure and are riveted to the inner flanges of the bolster diaphragms, to both top and bottom cover plates and to vertical flanges of the bolster center-brace casting.

The cross-bearers on the 50-ton box cars are each continuous structures over the entire width of the car. Each is made up of a single pressing of 5/16-in. plate which is cut away to provide openings through which the two center sills may pass. The openings are framed at the sides and tops with angles riveted to the cross-bearer and at the bottom with malleable-



End of the Cushion Underframe Showing the Bolster and Floor-Support Construction as Originally Applied to the B. & O. Cars

iron wear plates on which the center sills rest. The cross-bearers are all tied together with continuous longitudinal angles, one under each center-sill channel opening, which are riveted to the bottom flanges of the diaphragms. Three-inch, 6.7-lb. Z-bars, resting on the



The Duryea Cushion Underframe as Installed on the First B. & O. Cars Thus Equipped

bottom cover plates extend from gaged distances of 7 in. from stops on the back faces of the bolsters toward the first cross-bearers, their lengths being determined to clear the cross-bearers when the sills have moved inward by the full amount of their travel. The ends of these plates adjoining the bolsters are reinforced to form stops when the sills are moved outward through the bolster. In the Baltimore & Ohio cars the maximum travel of the sills has been fixed at 7 in. in either direction, or a total of 14 in. from maximum draft to maximum buff. The space between the center sills inside the inner cover plates is devoted to the housing of the cushion gear.

The body bolster is built up of flanged pressed

top flanges of the center sills, are tied to the tops of the cross-bearers by gusset plates. These serve as floor supports over the center sills.

The Coupler Gear

The coupler-gear housing consists of two cheek-plate castings and a spring-pocket casting. Key lugs on the cheek-plate castings are framed into the webs of the two center-sill channels and the castings are securely riveted in place. The spring-pocket casting seats against lugs provided on the cheek plates and forms a pocket for the coupler-gear spring. This spring has a free height of 13 in. and consists of a single coil of 1-11/32-in. bar, 5-7/16 in. in outside diameter. It

closes with a total travel of $2\frac{1}{4}$ in., developing a maximum force of 20,700 lb. It is assembled behind the coupler with an initial compression of 1 in. under a load of 9,200 lb. The coupler is secured in place by a draft key passing through the sill and coupler housing, which has a section of 6 in. by $1\frac{1}{2}$ in. The spring normally holds the coupler out against the key, which in turn bears against the front ends of the slots in the sills and housing. Under buffing loads, however, the coupler and follower are driven back against the spring through a travel of 1 in., the follower then going solid against the housing, which distributes the load to the center sills.

The Cushion Gear

The cushion gear is a simple spring device without friction elements. It consists of two single coils of 1-17/32-in. bar, $6\frac{1}{4}$ in. outside diameter, and 51 in. free height. These springs are assembled with an initial compression of $4\frac{1}{2}$ in. and go solid at a total compression of 12 in. The stops are so arranged that the sills and bolsters go solid after a spring travel of 7 in., which is $\frac{1}{2}$ in. less than the maximum working compression of the springs. Tension links extend through the coils and are keyed against a follower plate at the inner ends of the springs. At the bolster ends of the springs these links are secured by pins to lugs on the bolster center-brace casting.

In order that the action of the cushion gear may be clearly visualized, consideration will be given to the action at one end of the car, first with the sill subjected to a buffing force and next with the sill subjected to a pulling force, keeping in mind, however, the fact that both gears act in either direction and that the capacity of both gears is involved in both cases. Under a buffing force sufficient to overcome an initial compression of between 48,000 lb. and 49,000 lb. for the two gears, the outer follower lugs first take up the $\frac{3}{8}$ -in. clearance between them and the follower, which

spring, the inner follower lugs on the center sill carry the spring follower away from the tension-link keys and compress the spring against the outer spring follower, which bears against the inner face of the bolster center-brace casting. This compression may be con-



Condition of the Bearing Piece Under the Load in the Leading Car at the Completion of Four Impact Tests at Speeds from 2.8 to 5.8 Miles an Hour—One Duryea and One Conventional Underframe, with Both Couplers Blocked

tinued until the inner over-solid stops strike the inner face of the bolster center-brace casting after a maximum travel of 7 in.

The combined action of the two gears in the same



Twin Loading Tested by the Baltimore & Ohio Before the Impact Tests Were Made—The Car at the Left Is of Conventional Construction and the Car at the Right Has the Duryea Underframe

normally rests against the face of the bolster center brace. Further movement in the same direction picks up the follower, carrying it away from the face of the center brace and compressing the springs against the inner follower which is retained in a fixed position with respect to the bolster and car body by the tension links. Under a sufficient force, this movement may continue until the outer over-solid stops on the center sill engage the outer face of the bolster.

Assuming a pulling force applied to the end of the center sill sufficient to overcome the initial load on the

car may now be clearly visualized by remembering that when the gear at one end is acting as described for a buffing shock at that end of the car, the gear at the other end is acting as described for a pulling force at its end of the car.

The end force for complete closure of both gears is approximately 131,500 lb. With the initial compression as described, this provides a maximum energy absorption of something over 50,000 ft. lb. plus around 10,000 ft. lb. due to friction between the center sills and its several supports.

The A. R. A. specifications for friction draft gears call for a maximum travel of $2\frac{3}{4}$ in. and capacity limits of 18,000 and 27,000 ft. lb. Within these limits maximum end forces range upward from approximately 300,000 lb.

The springs in the cushion gear described are of double heat-treated silico-manganese steel.

Comparative Lading Tests

About a year ago the Baltimore & Ohio made a series of comparative tests between six cars equipped with Duryea underframes and six cars equipped with conventional underframe construction. Eleven of the cars were loaded with sewer pipe and one A. R. A. car was loaded with drain tile. The breakage in clay products lading of this class was 88 per cent more for the A. R. A. cars than for those having the Duryea underframes.

Operating and Service Tests

With the object of obtaining further information relative to the performance of the Duryea underframe, a test was made in January, 1929, at the Mt. Clare (Baltimore, Md.) shops of the Baltimore & Ohio, which consisted of dropping three loaded 70-ton all-steel hopper cars against a 50-ton box car equipped with the Duryea underframe which was loaded with 110,000 lb. of scrap and backed up by six loaded hopper cars of conventional type, which were anchored by setting the brakes and chaining the blocking to the track. The purpose of this test was to ascertain whether or not such abuse would damage the Duryea underframe car. The test consisted of a number of impact runs against the car at increasing speeds. At the conclusion of these tests an examination showed that the Duryea car draft keys were bent $\frac{1}{4}$ in. and that the end car of conventional design had one truck derailed and center plate rivets sheared. While the abuse given the box car was considerably beyond that which would be permitted in regular service and would only occur in case of accident, the test showed that the Duryea underframe car would stand up under such treatment.

In order to provide additional information relative to the operating characteristics of cars equipped with the Duryea underframe, dynamometer tests were made on the Adamstown branch of the Baltimore & Ohio the latter part of April, 1929. These tests proved to the satisfaction of the railroad that trains composed of cars equipped with the Duryea underframe could be handled over the road with more ease and less damage to equipment and would withstand emergency applications of the air brakes without derailment and without damage to the equipment or lading. In all the brake tests the Duryea underframes absorbed the shocks from either service or emergency applications. Movements of the car bodies on the center sills of from 1 in. to $1\frac{1}{2}$ in. resulted from emergency applications at 12 m.p.h. with a 100-car train, and 13.1 m.p.h. with a 125-car train. Impacts due to emergency applications, which were registered in the dynamometer car at the head of the train, a car in the center of the train and the last car in the train, showed none of the impacts to be of a force that would indicate abuse or rough handling.

Test of Multiple Loaded Cars

It was suggested by a shipper that it might not be safe to make shipments of multiple loaded cars equipped with Duryea underframes, or such loading on mixed cars composed of one or more cars equipped with the Duryea underframe and one or more with the con-

ventional underframe. With the object of ascertaining the behavior of multiple loads under such conditions, tests were made during the latter part of April, 1930, which indicated that lading could be handled more satisfactorily on two or more cars equipped with Duryea underframes than those equipped with the conventional underframe. These tests also indicated that such lading could be placed on mixed cars equipped with both Duryea and conventional underframes without damaging the car or lading more than would have occurred if the loaded cars had all been equipped with conventional underframes.

These tests consisted of five different combinations of cars under multiple lading; namely, two Duryea underframe cars with the coupler horns blocked; two conventional underframe cars with the coupler horns blocked; two Duryea underframe cars without blocking behind the couplers; one Duryea underframe and one conventional underframe car with both couplers blocked, and one Duryea underframe without blocking behind the couplers and one conventional underframe car with blocking behind the coupler.

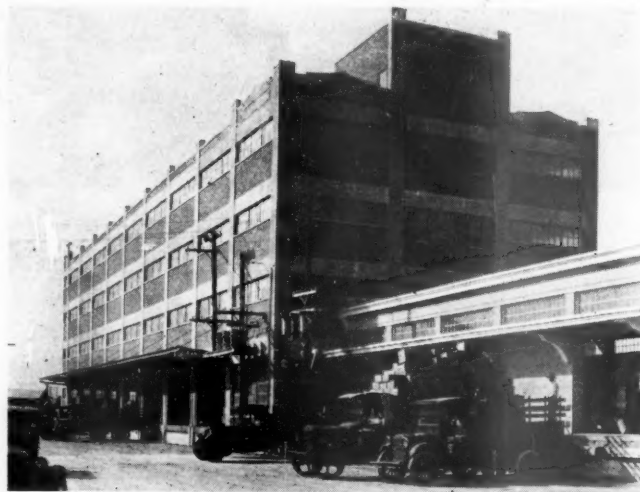
When using two cars equipped with the Duryea cushion underframe under double loading it took five impacts of the Duryea cars to distort the lading to a point where the cars were required to be shopped for resetting of bracing, while under identical conditions it only required four impacts to distort the lading to a point requiring the cars to be shopped for resetting of bracing on two cars equipped with the conventional underframes.

The results indicated that with any of the combinations of cars used on the tests, impacts at normal speeds can be successfully withstood.

According to Baltimore & Ohio advises service records, no cars equipped with the Duryea underframe have been shopped for repairs of any kind to the cushion gear, and cars so equipped are expected to last the life of the car and eliminate maintenance costs of draft gears, as well as materially reduce damage to lading and shopping of cars for repairs.

MORE EXTENSIVE TELEPHONE CONNECTION with Mexico is announced by the American Telephone & Telegraph Company, a contract for exchange of traffic having been made with the Ericsson Telephone Company, whose lines extend to some forty cities and towns in the eastern section of Mexico.

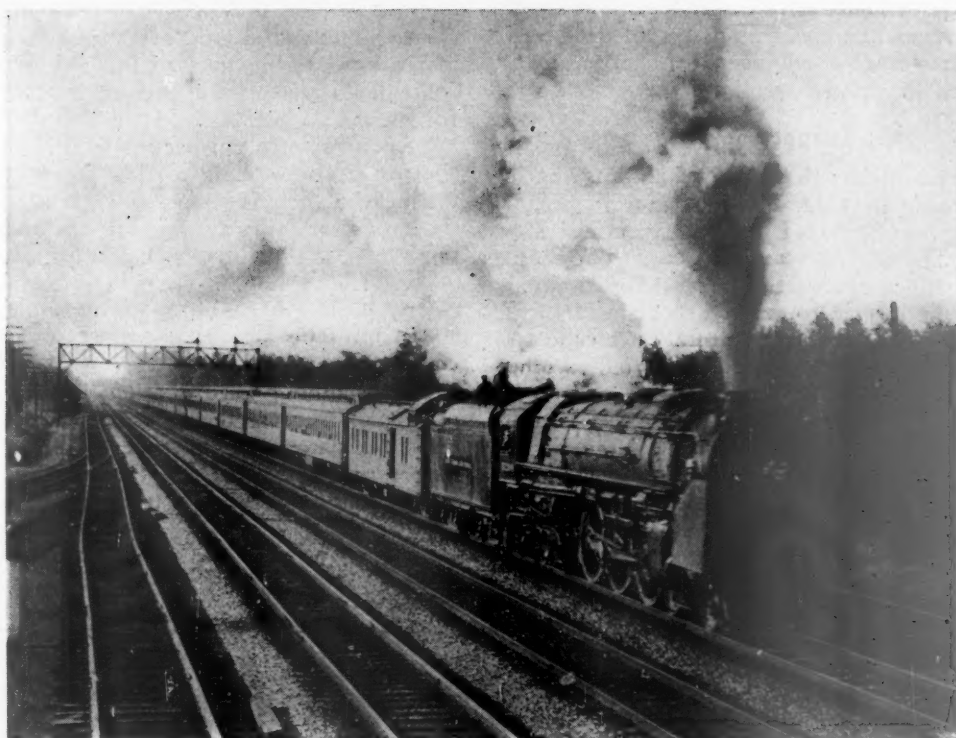
* * *



Florida East Coast Photo

The Florida East Coast Freight House at Miami, Fla.

A 26-Car
Passenger
Train
under
Dynamometer
Test
on the New York
Central



Dynamometer
Equipment on
Front of and
Behind
Locomotive

Materials Inspection Stressed on New York Central

*Laboratories are maintained and over 200 skilled men
protect buying and study service failures*

THE testing, inspection and analysis of railway materials constitute one of the least known and least emphasized of railway activities although its influence on safety and economy of operation as well as on the development of railway materials is great. The New York Central lines have two large laboratories and employ more than 200 men in this work. The organizations include engineers, chemists, metallurgists, lumber and fuel experts and even bacteriologists. The best colleges in the land are represented by those engaged in the work. Co-operation in the preparation of the specifications which underlie the bulk of New York Central purchases, and the examination of material conditions and processes to see that the lines get their money's worth in purchasing, are functions of these men who are stationed in laboratories, factories, shops, forests and field. They are active in research to determine what kind of material a road should buy and the service life of material. They also inspect shop practices. At present, several hundred items of material are undergoing service tests. Wrecks caused by failed materials have been reduced 11 per cent in the last three years by reason of the department's activities.

Work Divided

The New York Central has largely consolidated the work of the several lines forming it, while the activities

are divided generally into five divisions. The field inspection of ties, timber and other forest products is performed by an organization of 63 men reporting to the vice-president of purchases and stores of the New York Central lines. A corps of fuel inspectors, comprising 14 men, also reports to the vice-president of purchases and stores. The New York Central does its own inspecting of rail, track material, steel wheels and structural steel, and this organization comprises 26 men under the jurisdiction of an inspecting engineer reporting to the president. There is also an electrical inspection force, working under the supervision of the electrical engineer.

The inspection of all materials for equipment, also miscellaneous materials and all laboratory work, is conducted under an engineer of tests reporting to the chief engineer of motive power and rolling stock. This department comprises an organization of 115 men, including 25 chemists and assistants, who are available for all kinds of inspection, analysis and research work in laboratories at West Albany, N. Y., and Collinwood, O. There are 55 inspectors in the physical laboratories at Collinwood or at other points for the inspection and testing of materials purchased by the lines. The organization also includes 11 men engaged exclusively in the study of the service life of materials and devices used on equipment, 5 shops and equipment inspectors to investigate all materials causing train failures, a special

engineer in charge of locomotive boiler tests and special studies, another special engineer in charge of draft gear tests and a dynamometer engineer in charge of all dynamometer and locomotive road tests.

Rail Inspection

The rail department has the task of handling the inspection of approximately 225,000 tons of rails, 75,000 tons of track material, 75,000 tons of structural steel and upwards of 30,000 steel wheels a year. The 26 inspectors forming this organization are stationed chiefly at points where the largest tonnages are manufactured, these centers being the Pittsburgh, Buffalo, Chicago and Eastern districts, although the men are shifted to other localities as the need arises. All of the men who specialize in rail inspection have had long experience in the rail mills. They are versed in every step in the process of manufacture and give constant attention to the various details to see that the requirements of the railroad are properly and fully protected from the start of the steel making to the shipment of the finished product.

The men usually work in groups of two to four and personally inspect each rail before shipment, in close cooperation with the inspection department representatives of the rail mill. Checks are made to see that the steel has been well made, properly poured into molds, stripped and charged in reheating furnaces, brought to uniform heat for rolling, the ingots rolled to bloom size and then accurately rolled into finished rail to meet carefully made gages. They also watch to see that the rails receive proper handling on the hot beds to insure uniform cooling conditions, that the finishing department properly performs its duties in straightening the rails, checking the length, drilling, filing, chipping and making the preliminary surface inspection. The rails are finally subjected to a re-inspection by the New York Central forces in conjunction with mill inspectors, which inspection covers the entire length of every rail on all four sides for the purpose of weeding out defective rails or those of inferior quality or workmanship and to see that such work is corrected before final shipment. Every precaution is thus taken to insure that every rail has been identified by hot branding and stamping of the heat and ingot serial numbers, that the rails are free from injurious defects, that they have been accurately rolled and that the rails are straight in line and surface, etc.

The inspection forces also supervise rigid physical tests which every rail must pass to be accepted, and careful records are kept of the results between the various plants, with which to study the uniformity of results from one rolling to another. As a result of their observation while on duty at various rail mills, the inspectors have been able to offer valuable suggestions to the mills for rail handling and manufacture as well as to protect the road against defective manufacture.

Structural Steel and Wheels

Steel wheels are closely allied to steel rails because of their service and also because of the similarity of their composition and manufacture to that of rail. Their inspection presents many entirely different problems, however, but the work is covered in the same thorough

manner as the rails. The processes of manufacture are closely followed up and every wheel receives a personal inspection by a member of the New York Central staff, following the work carried on by the mill's inspection forces.

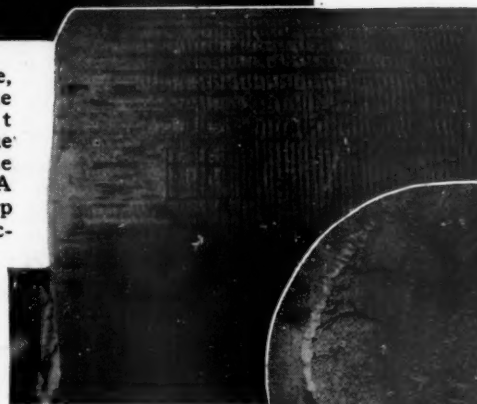
Structural steel inspection is divided into mill and shop inspection. The former consists in checking and testing the various shapes, etc., before they are sent to the shops for fabrication, while the shop inspection is in the hands of carefully selected men who have had years of experience in this particular field, and the various stages in the fabricating work are under constant supervision until the finished member or assembly has been completed.

Corresponding care is taken in the inspection of the variety of track materials such as frogs, switches, splice bars, tie plates, bolts, spikes and the other items to insure uniformity of fit, finish, general workmanship and that tests are made to meet the specified requirements. Accurately made gages are used in checking the dimensional features of these materials, and close tolerances are enforced.

The rail department is engaged in numerous other activities, including the collection of failed rails. Co-



A Broken Axle, the Poor Lathe Work That Caused It and the Appearance of the Fracture — A Reason for Shop Practice Inspection



operative studies of failed material are conducted regularly. Elaborate studies

are made of the service of wheels, as well as of defective ones. Shop practices in the mounting and turning of wheels are checked. Service investigations in the field of rails and other materials that go to make up the track structure are also being made. Plants and processes are investigated, following up numerous special tests of materials in service, and there are also consulting duties with the engineering and mechanical departments.

The department is active in national engineering organizations, and also serves on the committees of the New York Central lines, promulgating standard designs and specifications. Lately the track department has been assigning supervisors, or their assistants, to the inspection corps and has thus given the department a further outlet for its work in giving the trackman a better understanding of the value of the material he handles.

The work of the equipment materials department has greatly increased in recent years. This has resulted not



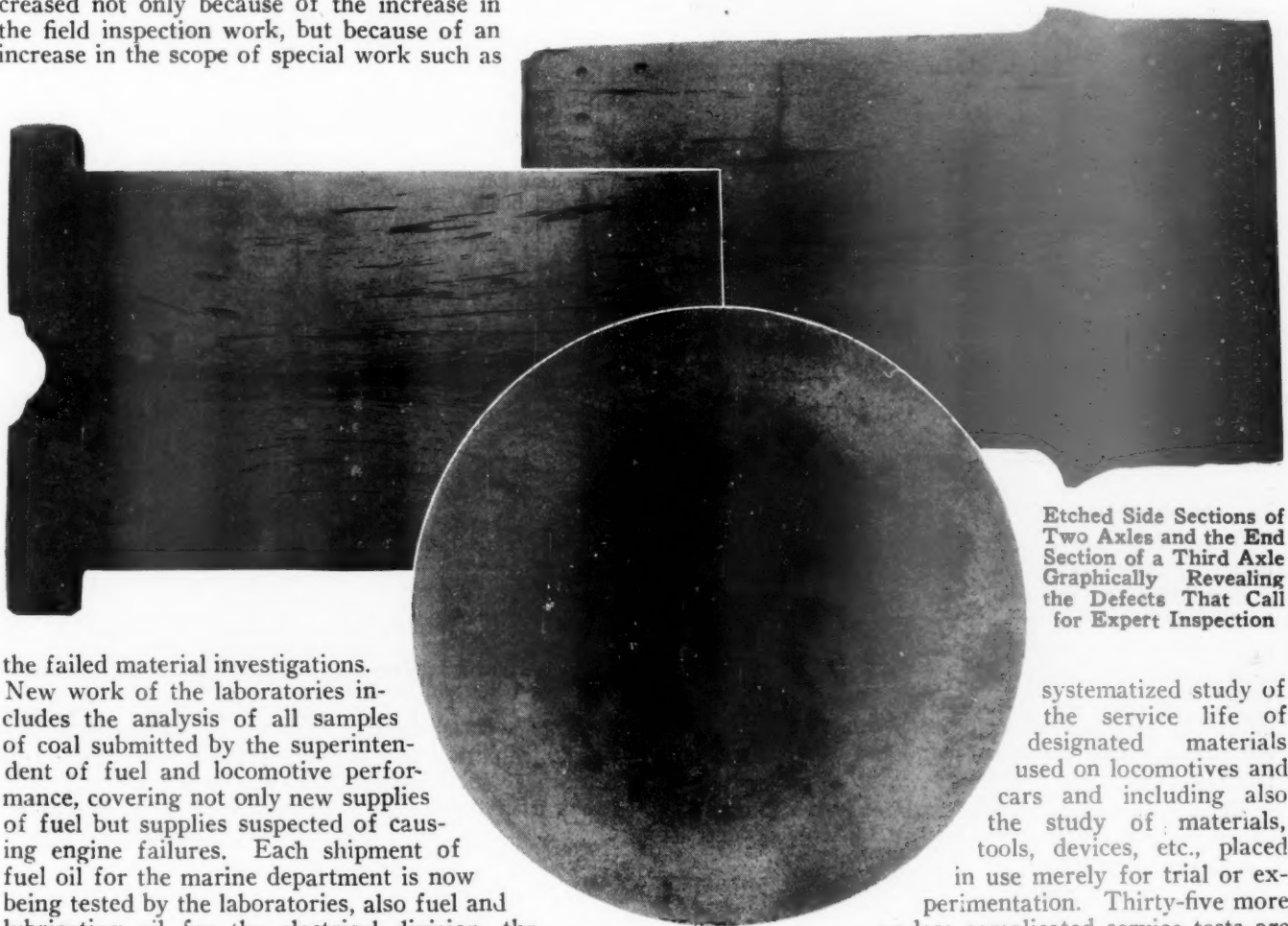
only from the addition of more items of material to the inspection lists, but also from the more rigid specifications in force or their more rigid enforcement. The inspection of purchased materials by the motive power and rolling stock sections now covers approximately 230 classes of material for the New York Central lines and the Rutland railroad. From January, 1928, to October, 1929, this department inspected 1,482,000 journal bearings, 973,000 malleable castings, 503,000 steel castings, 390,600 ft. of chain, 143,360 couplers, over 1,000,000 pieces of air and steam hose, 518,500 ft. of miscellaneous hose, 45,000 rods of fencing wire, 440,000 springs, 1,428,500 steel bars, 564,000 cast iron wheels and 7,594,400 lb. of waste, while 45,419,182 lb. of scrap brass were inspected and check-weighed, much to the benefit of the company. The work of the laboratories at West Albany and Collinwood has increased not only because of the increase in the field inspection work, but because of an increase in the scope of special work such as

The laboratory is growing so rapidly by reason of the increasing demands upon it that plans are being considered for new laboratories at both points.

It is one of the test department's functions to assist in the preparation of specifications governing the manufacture of materials, and all material specifications are submitted to it for review and criticism before adoption. Occasionally it is necessary to make laboratory experiments before opinions concerning the specifications can be given.

Service Tests

In the interest of both economical buying and operation, the test department of the New York Central lines is engaged to an ever-increasing degree in conducting so-called service tests, comprising the organized and



Etched Side Sections of Two Axles and the End Section of a Third Axle Graphically Revealing the Defects That Call for Expert Inspection

the failed material investigations.

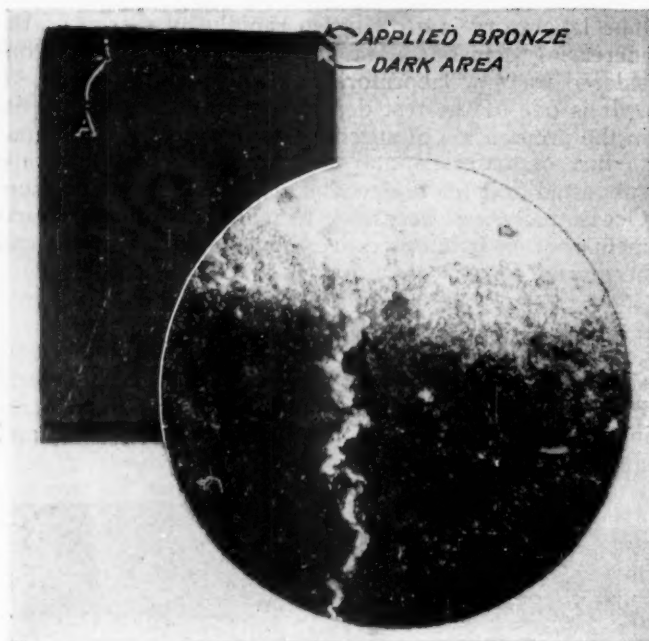
New work of the laboratories includes the analysis of all samples of coal submitted by the superintendent of fuel and locomotive performance, covering not only new supplies of fuel but supplies suspected of causing engine failures. Each shipment of fuel oil for the marine department is now being tested by the laboratories, also fuel and lubricating oil for the electrical division, the latter work having been attended by the complete absence of train failures from that cause during the past winter. In addition, the laboratories have undertaken considerable work for the claim department, ranging from the examination of candy, rice, soap, salt, sugar, coffee, etc., to the fumigation of cars infected by insects.

Sanitation Work

The work has been enlarged to include the examination of and experiments with various fumigants to kill rodents, etc., and the regular examination of commissary supplies, such as milk, cream and ice cream, also the examination of chemical weed killers. A modern bacteriological laboratory has been established at Selkirk, N. Y., for the sanitary examination of drinking water supplies and, at Collinwood, a special laboratory has recently been provided for electric traction work.

systematized study of the service life of designated materials used on locomotives and cars and including also the study of materials, tools, devices, etc., placed in use merely for trial or experimentation. Thirty-five more or less complicated service tests are now being conducted, involving 6,000 test units on 900 locomotives and 634 cars, while 225 experimental tests are being followed, involving over 83,000 units on 24,485 cars and 618 locomotives, which are distributed among the lines. These tests and those previously named do not include those affecting maintenance of way materials or forest products which are under study by the other inspection divisions. In contrast with the not uncommon practice for railroads to handle service test work in a more or less unorganized way, the New York Central has equipped and planned its test department to serve as a clearing house for practically all information concerning service tests and other experimental work affecting the design and purchase of materials and equipment.

A vital factor in the purchase and use of the material for equipment is its safety. A saving resulting from



The End of a Main Rod Built Up With Bronze and a 400-Time Magnification of the Spot "A," Showing the Kind of Cracks Which the Welder Doesn't See But Which the Microscope Finds Underneath the Weld

the purchase of a less expensive for a more expensive material is a mockery if the material causes wrecks or delays to train movements. This interest in material has been furthered on the New York Central by the organized attention given by the test forces to failed materials. Prior to 1924 the work was confined largely to wheel failures, but the work has expanded until at present the inspections of failed materials cover nearly all important failures of locomotive and car materials. The test department has virtually become a fingerprint expert for the road in this field of regulation. Wherever a derailment or delay to train service, chargeable to broken or defective material, occurs or wherever equipment inspection discloses defective material, the test department receives a report with or without the material involved and as quickly as possible directs especially assigned inspectors and other resources to a determination of the causes and the correction of the trouble.

Each failure is catalogued and each year a tabulation of all failures investigated is made. This report lists

the failures by classes of material and gives (a) the number of derailments; (b) the number of delays; and (c) the number of inspection failures with which each class of material is charged on (a) the lines west of Buffalo; (b) the lines east; (c) other system lines; (d) on all lines. These are supplemented by a record of the total failures investigated in previous years. The report not only summarizes but singles out the offending material and compares one region with another.

The materials listed are as follows:

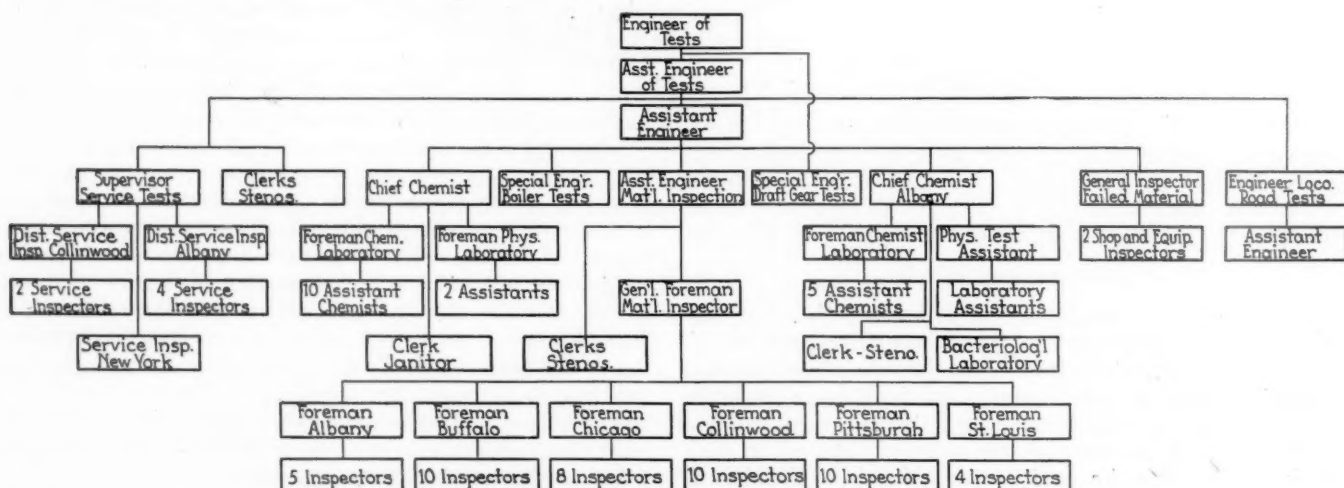
Locomotive Parts

Driving axles	Combination levers
Trailer axles	Union links
Tender axles	Radius bars and bolts
Firebox parts	Piston heads and bull rings
Boiler tubes	Piston rods
Driving boxes	Reverse gear
Trailer boxes	Main rods
Tender boxes	Side rods
Engine brake hangers	Butt end straps
Other brake parts	Rod collar bolts
Main crank pins	Driving spring hangers
Crossheads and bolts	Misc. spring rigging
Crosshead plates	Superheater units
Crosshead shoes	Tender brake parts
Wrist pins	Back couplers
Crosshead keys	Back coupler pocket
Cylinder heads	Tender truck equalizers
Draw bars	Tender truck arch bars
Draw bar pins	Booster parts
Eccentric cranks	Valve stems
Eccentric straps and blades	Miscellaneous parts
Eccentric rods and pins	Driver tires and wheel centers
Wedge bolts	Trailer tires
Guide yokes	Trailer wheels
Stoker reversing rod	Tender truck wheels
Cab handholds	"Steam whistle" parts
Links and parts	

Car Parts

Coupler yokes	Steel wheels
Knuckles, pins and carrier irons	Broken cast iron wheels
Frames, passenger	Loose cast iron wheels
Side frames, freight	Burned-off journals
Arch bar trucks	Broken-off journals
Bolsters	Broken axles, except journals
Spring planks	Air hose
Pins, bearing & safety hangers	Brakes, truck equipment
Equalizers	Truck springs
Pedestals and spreaders	Gas rail car parts
Journals, bolts and wedges	

It also classifies the failures by causes and thus directs attention to bad shop practices as well as the improper use of material. Last year's report covered a great many investigations, involving over a hundred classes of material. This is a larger number of investi-



The General and Equipment Testing Organization—Does Not Include Track Material, Lumber and Electric Branches

gations than was studied in previous years. This increase from year to year should not be misunderstood. It does not result from the fact that material failures are increasing on the New York Central, even though the annual report of the test department showed a greater number, but simply means that the New York Central is making a determined study of materials. The investigations, made by disinterested and competent persons, invariably set in motion revisions of specifications or other action, while the publication of the list spreads and crystallizes interest.

Check Shop Practice

The shop inspection work being done by the test department is one of the results of the attention given to failed material investigations. It consists of co-operative work between the shop management and the test organizations, whereby test men familiar with the failed material investigations and with shop work regulations are assigned to check shop practices, note departures from prescribed practice and otherwise work with the local supervisors to get the best results out of material and particularly to prevent its failure in service. The substitution of copper sledges for steel sledges for testing main and side rods in shops as a means of avoiding rod failures in service, the discontinuance of the use of torches to remove retaining rivets from tires and to bevel off the front ends of main rods, improvements in annealing crank pins and piston rods, the substitution of clear varnish for black paint in coating rods and motion work and improvements in wheel mounting practices are typical results of the activities.

It is impossible to determine the full effect of the department's work in connection with failed material investigations and shop inspections, but the figures concerning derailments on the New York Central are considered highly significant of the contribution to securing safer operation.

There were 19 less derailments caused by failures of material used on equipment in 1928 than in 1926, while the number of derailments per billion locomotive car miles in 1928 were 11 per cent less than in 1926.

Co-operation with National Societies

The test department does a variety of special work suggested by its findings in connection with the routine inspection and testing of materials, or which arises independently of these activities. Its dynamometer work is extensive and its active participation in national railway or other scientific committee work for the purpose of formulating uniform specifications and standards, or for the purpose of keeping in touch with scientific developments and maintaining a close personal contact with other authorities in science, is noteworthy.

Among prominent activities and studies of a specific nature conducted by this test organization of the New York Central in the last several years, either as a part of its regular functions or by special request, are several series of road tests of 70-ton cars equipped with various designs of truck springs, which resulted in the abandonment of a design of spring which had been proposed for approval as an A. R. A. standard.

After a majority of all passenger train delays during one winter was found to result from steam hose failures, and an examination of approximately 4,000 failed steam hose showed that a large proportion of the failures was due directly or indirectly to steam burns, investigations and road tests were conducted which resulted in the adoption of 2-in. flexible metallic connections in place of 1½-in. rubber hose, formerly used.

As a result of investigations and tests of cast steel side frames involving 125 complete fatigue tests and 150 static tests, new system specifications for side frames were adopted which are 50 per cent more severe than the A. R. A. specification then in effect, the frames being used in large numbers without any failures being reported up to the present. During recent years, as a result of a number of failures of passenger car axles, the practice has been followed of drilling and analyzing all passenger car and tender axles purchased by the New York Central lines, a practice which has required a large amount of work but results in keeping inferior axles out of service.

As a result of investigations of journal box packing troubles, initiated long before the A. R. A. issued its recent rulings on this subject, the practice of giving closer attention to the condition of packing selected for reclamation was started and orders issued requiring that reclaimed packing of other than the best quality be confined to freight car service. After making a large number of analyses and tests of 21 different brands of black enamel, the department has prepared a definite quality rating of the products of each manufacturer for the purchasing department.

Inspect Reclamation Work

The test bureau has co-operated with the supervision of reclamation in devising methods of reclaiming large numbers of journal bearing wedges and other materials formerly scrapped, and has co-operated with the New York Central Lines' Wheel and Axle committee in the preparation of an illustrated manual of shop practice instructions covering all wheel and axle work. A comprehensive investigation of locomotive water boiler conditions was made by the department for the purpose of determining the locations where water should be treated and the kinds of treatment necessary and the department has since been assisting in carrying out the recommendations of the report.

The department furnishes the chairman of the committee charged with the duty of fixing the standards for small tools and other shop equipment of various kinds on the New York Central lines, such as abrasive cloth, pipe wrenches, sledges, rivet sets, etc., and, like the rail inspection staff, is actively represented in such national associations as the American Railway Association, the American Society for Testing Materials, the American Society of Steel Treathers and the American Railway Engineering Association.

Inspection Methods

A summary of the New York Central's test work may appropriately include a word regarding the general procedure of the inspection work in purchased materials. These are principally purchased subject to inspection at the point of shipment rather than at destination. The conditions are set forth in the specifications and the proper inspection department is notified by receiving a copy of the order for any material purchased. It then rests with the supply firm to notify the inspection department when the material is ready for inspection. Usually the instructions in the specifications require five days' advance notice, and the notice may be by letter, telephone call or any other means at the option of the firm unless a formal notice is required. All copies of orders received by the stores department disclose whether the inspection is required, and it is understood that material subject to inspection may not be accepted or invoices passed for payment until the inspection department's approval is obtained. This approval is shown

on a special form and if the form is not received when the material is shipped, it devolves upon the store department to trace the inspection department for it.

A report of each inspection is prepared, showing the amount of material inspected or rejected and the direct expense of making the inspection. This report is filed in the test department where it is available for references. Owing to the large amount of clerical work involved, the department does not regularly prepare summaries of the inspection results but the records are kept in such shape that this can always be done when required. The department's chief concern is to see that all material, subject to specifications, receives inspection, and that this is done with the least delay to the movement of material from the source of supply to the user.

Questionnaire on Motor Transportation

WASHINGTON, D. C.

THE Interstate Commerce Commission has sent to the railroads copies of a questionnaire, to which they are to reply by August 15, calling for detailed information regarding motor vehicle operations in which the railroads are interested in connection with the commission's investigation of co-ordination of motor transportation. The information called for is designed to give the commission a complete picture of the operations carried on directly or indirectly by the roads and also as to their efforts to meet the competition of motor transportation.

Schedule A of the questionnaire calls for complete information regarding the intercorporate and financial relationships in respondent's motor vehicle operations. Schedule B asks for details of motor bus operations, such as number and mileage of vehicles and the revenues derived, while Schedule C calls for similar information as to motor truck operations. Schedule D, relating to passenger transportation, calls for information regarding the publication of tariffs, including those providing for transportation by terminal motor coach services, and as to the manner in which terminal bus lines are compensated for such terminal service.

The question is asked as to whether the lawfully established tariff and baggage charges of respondent are collected and retained by it in every instance for transportation in connection with motor coach lines and respondents are asked to give the general bases upon which motor coach fares are established. If respondent competes over any portion of its rail or water lines between any points with motor coach lines operated by other rail or water carriers, or independently operated, it is asked to give detailed data with respect to representative examples.

In all instances in which rail or water lines of respondent have either been abandoned or passenger-train service discontinued, motor coach service being established in lieu thereof, it is asked to state terminal points and mileage of each such service and also its mileage affected. One question reads: "Give complete information as to all situations not herein specifically covered in connection with co-ordination of motor bus services and those of respondent with respect to fares, charges, governing rules, tariffs, divisions of revenue, transportation services, and other pertinent features."

Schedule E calls for similar information regarding

motor truck transportation, such as tariff provisions, extent of service performed, whether service is in competition with other carriers, terminal services, etc.

In Schedule F questions are asked regarding accounting methods, compensatory character of service, intrastate regulation, abandonment of lines, competition with independent motor lines, and general advantages of a co-ordinated rail and motor service. Respondents are requested to state clearly the extent to which the accounting for investment in and operations of all facilities used in motor services are merged with and made a part of that for rail, water, or rail-and-water operations; to show the allocation of time of their employees engaged in both rail and motor operations; and to show briefly their method of computing the cost of service performed by motor vehicle.

Among the other questions are:

To what extent has loss of revenue from operation of motor coaches and motor trucks in competition with respondent been a reason for abandonment of respondent's rail lines?

To what extent has respondent offered to substitute motor coach or motor truck service if abandonment should be permitted?

In what cases has Interstate Commerce Commission or state commission required or authorized respondent to establish motor coach or truck service as a substitute for service performed over the rail line to be abandoned?

State generally what efforts respondent has made to meet motor coach competition through faster service, improved facilities, reduced rates, or in any other manner in the operation of its rail (or water) lines.

State generally the results of such efforts to meet competition.

* * *



Anhalter Station, Berlin, Germany

Knowledge Essential for Safety*

Operating officer must know practical side of railroading and problems of subordinates

By W. M. Jeffers

Vice-President Operation, Union Pacific System

PROFICIENCY in the art or science of railroading has to be acquired by experience and by word-of-mouth instruction. There is probably no general trade, profession or industry with so little of its technique recorded or outlined in text books. I think also that there is a greater diversity of conditions affecting operating methods on a railroad than in any other large industry. Each railroad, each town, each yard, almost each mile of track, has peculiarities which make operation there just a little different from that anywhere else. There is, of course, some similarity in the way that general railroad work is carried out on all roads, but no operating man can be very efficient until he becomes intimately acquainted with all the little details as well as the major conditions on his territory.

I make these statements as a preface to what seems to me the first essential to operating a railroad safely—that is, the operating officer must know the practical side of railroading and he must know his own railroad thoroughly. He is the man from whom constructive criticism is expected and if he is going to offer really constructive criticism on the methods of his subordinates, instead of merely complaining, he must understand the problems and difficulties of their work as well as they do. That fact will confront him just as soon as he starts demanding explanations of accidents. The average operating officer today is that sort of man. The old days of swivel chair supervision are gone and with it has gone, perhaps, some of the romance, at least some of the fiction of that earlier day. It was the lack of intimate knowledge of details on the part of officers which used to permit the railroad man to offer such clever and ingenious alibis for things that apparently just happened.

I recall at one time hearing an explanation of a serious derailment that illustrates my point. The tender of an engine had been derailed and several cars wrecked. After looking over the scene and checking up the equipment, the verdict was that the coal pick must have fallen through, between the engine and tender, going under the tender wheels and causing derailment. This theory absolved the trackmen, the mechanical department and all others from any blame.

Understanding then that we must have an experienced and practical operating officer, the next essential to real safe operation must be stated this way: He must actually believe that accidents and personal injuries can be prevented to the point of almost total elimination and he must make a determined resolution to bring that about. He is the man who must put safety first. If he takes this positive stand and sticks to it much will be accomplished in the territory under his jurisdiction.

This essential determination on the part of the officer to stop accidents applies all the way up to the top. In fact, the higher you go the more it applies. It is fine

for a roadmaster or a trainmaster or a roundhouse foreman to get that idea, for it will mean safer operation on his particular subdivision by his group of men. I have often seen fine no-accident records made by sporadic drives or campaigns in a local district or plant. But a whole division is not going to make a showing until its superintendent gets keyed to the necessary pitch, and to get several superintendents keyed to the same pitch at the same time requires pressure from still further up—sometimes a whole lot of it. When that pressure comes from far enough up, you begin to get some uniformity of performance.

I know just how steady and insistent that pressure can be. We thought we had a fine safety record back in 1920 when Carl R. Gray came to our lines as system president. At that time we were having about 13 casualties to employees for each 1,000,000 man-hour worked. But we began to feel pressure and we have been feeling it ever since. The casualty rate for last year was 2.47, but the pressure is still on.

I might add for the benefit of some of you from the east that we also have as severe pressure of operating conditions as can be found anywhere. You will realize this when I tell you that the average speed of all our freight trains last year was higher than that of any other large trunk road in the country. On the parent unit of our system, with over 4,000 miles of operated line, our gross ton miles per freight train hour were likewise higher than on any of them. That is the figure which best portrays the intensity of operation. Our passenger trains are permitted, by rule, to make 70 miles per hour and the authorized speed of our freight trains is 45 miles per hour, and you may be sure most of them do it every day. The density of our traffic during the busier portion of the year is not exceeded by any similar double track railroad in the country.

Safety Department Must be Aggressive

Another necessary step in any effective campaign waged against accident and injuries must be the organization of an active and aggressive safety department with a personnel adequate to discharge the duties devolving upon it. I have always felt that it was best for the safety department to be entirely independent of other departments or local officers. This is necessary to enable the safety inspectors to function without fear or favor. Perhaps on our road we have had a rather unusual conception of the way that such a department should function. It is, of course, customary for this department to do much of the so-called "inspirational work," through the medium of rallies, addresses, published articles and the like. We have had them do all that. But from our early experiences we came to realize that such efforts would not alone accomplish results we believed were possible. To enable a directing officer to keep a firm grasp on the conduct of operations, it is necessary for him to know absolutely just what is

* From an address made before the annual meeting of the Safety Section, A. R. A., at Denver, Colo., on July 2.

going on in the field and just how supervisors as well as employees are carrying out instructions and complying with the rules. My conception of the function of the safety department in this respect is that it should be the "eyes and ears" of the directing officer. It simply is not in human nature for subordinate supervisors to be very energetic in reporting laxity of performance or negligent conduct of employees under their own jurisdiction. Having his own independent force continually checking performance insures the higher officers getting full information and the knowledge that such observations are being reported adds a wonderful impetus to the zeal of subordinate supervisors and employees. Of course, in every case of accident or personal injury of consequence, the safety department should properly participate in the investigation, and render an independent report of its findings.

Immediate, thorough and fearless investigation of every accident is the surest way to prevent others. There must be no mysteries about how accidents occur. Find the real fault and turn the spotlight on it. Neither the fear that admission of error may affect a claim settlement, nor the fear that the truth may disclose incompetence of the supervision, should deter an intelligent and experienced investigator from bringing out the actual facts. If we are to blame, we had better know it at once than to find it out after expensive litigation. We place much dependence on the safety department in helping us get to the bottom of accident causes.

On our road we also require road officers to have safety inspectors accompany them when making many of their surprise tests, to assure that these checks are fair and impartial and that results are correctly disclosed. In addition, the safety inspectors make many independent tests of their own for the same purpose.

Employees Must be Familiar with Requirements

Assuming that a vigorous policy has been adopted and an effective personnel established, it seems to me that the next requisite is to make sure that all employees and supervisors understand and are entirely familiar with the details of the safety requirements of their duties. This means that rules must be formulated covering all conditions where hazard of accident is obvious. Both the wording and the interpretation of a rule are important. Most railroads have plenty of rules—sometimes more than enough. But it is one thing to have a rule, another thing to have it understood by all alike, and still another to enforce it uniformly. You cannot fairly condemn an employee for violating a rule, unless you and he both know that he is familiar with it and understands it. This requires thorough examination before the employee is allowed to assume responsible duties and frequent re-examination. On the Union Pacific we employ six full-time rules examiners and by working steadily they get over the entire personnel about every two and one-half years. Our re-examinations are just as precise as the original—even more so. Not only all employees in train service, mechanical and maintenance foremen, signal maintainers, etc., take these periodical examinations, but roadmasters, division engineers, master mechanics, dispatchers, trainmasters and division superintendents take them too, and they are required to have a certificate that they have qualified on rules just the same as a conductor or a section foreman. No superintendent or general superintendent can alter or abrogate a rule or its interpretation without authority from the general manager. It goes almost without saying that enforcement of all rules and instructions is fundamental to safety. I am unable to understand any other point of view.

I regard surprise tests as absolutely necessary to assure that the rules are being enforced. The term "surprise tests" sounds rather ominous to the less thoughtful railroader and especially to men who have had but little experience with such methods.

The surprise test or check-up is a different story when properly handled. The man who has been thoroughly drilled on what is expected of him, who has been taught that he must do the job that way every time, and that no foreman or supervisor will be allowed to criticize him for taking the necessary time to do it—that man will be glad to "do his stuff." He will begin to take pride in his expertness.

Toleration of "cutting the bases" on rule observance must mean one of two things—either the rule is wrong or the supervision is weak. Usually it is the latter. In either case the fault can and should be speedily remedied. Enforcement methods have been responsible for much controversy and misunderstanding. It would perhaps be more correct to say that laxity of enforcement has developed most of the misunderstandings and controversies over the application of discipline. Forty years of active railroading have convinced me that as a body railroad employees are as fair minded and reasonable as any group of industrial workers anywhere. They understand and accept discipline when they recognize it as being just, impartial and deserved, and consistently applied. They will not evade responsibility if it is definitely imposed in them.

Subordinate Should Not be Made the Scapegoat for Superior

I have never taken much stock in the theory that responsibility cannot be delegated to subordinates, but we are very scrupulous to see that in any case of negligence or failure, responsibility is justly placed, and a subordinate employee is not made the scapegoat for a superior officer. It may be proper to dismiss a fireman for letting the water get low enough to burn a crown sheet, but the engineman on that locomotive is the man primarily responsible for knowing how the water stands and should be assessed the full penalty for negligence of duty. We apply that theory all the way through.

To emphasize the open-minded and understanding attitude of railroad employees on the application of discipline, it is significant that on the Union Pacific where vigorous enforcement has been practiced for many years, there has not been a single controversy between the management and any employee organization carried to an outside board of mediation or arbitration. I think that this is not so much a compliment to the wisdom of the management as to the fairness of the men and to their almost uniformly excellent judgment in selecting their representatives. I have had some tough sessions with committees of our organized employees and often what made the sessions so tough was the fact that some officer below me was showing less judgment and intelligence than the representatives of the employees. It is to the great credit of the latter that they have uniformly conceded, and even contended for, the necessity for enforcement of safety regulations. The ideas embodied in many of our safety rules have been originated by members of the Brotherhood of Railroad Trainmen and similar organizations and their energetic co-operation is largely responsible for the measure of success attained. No better evidence of their sincerity could be asked than the voluntary attendance of from 200 to 275 of them each month, entirely on their own time, at the regular safety meeting of our Nebraska division. Nearly as many attend each meeting on several smaller divisions. This joint interest in accident prevention has

proved to be the common denominator for solving many other problems involving relations between the management and the men.

This employee co-operation is not a one-sided affair—co-operation can never be that. The management must do its full part. It is necessary for any industrial concern to prove its earnestness by providing safe conditions and equipment and by correcting physical or mechanical conditions where the expenditure can be justified by the degree of hazard existing. Money judiciously spent this way is well invested. Further, if the expenditure is directed by good engineering, the result is usually not only elimination of hazard but improved efficiency.

Pennsylvania Transfer Tariff Disapproved

WASHINGTON, D. C.

ON technical grounds, and without deciding the principal issue involved, the Interstate Commerce Commission has found not justified the tariff filed by the Pennsylvania providing for the transfer, without additional charge, of passengers traveling in parties of 25 or more, between the Pennsylvania station in New York and points in the boroughs of Manhattan, Bronx and Brooklyn, and also between its station in Newark, N. J., and other points in Newark. The tariff was filed by the Pennsylvania to meet the competition of the Baltimore & Ohio motor coach service which it established in 1926 after its use of the Pennsylvania terminal in New York had been terminated.

"Without passing upon the lawfulness under section 15a of the act of free transfer service such as respondent is here proposing to establish," the report of Division 5 said, "we think that the proposed schedule is objectionable, among other reasons, because it lacks the clarity and definiteness contemplated by Section 6 of the act and required by our tariff rules, and would create undue prejudice in violation of section 3 of the act." The tariff schedule had been suspended pending an investigation and the commission has now ordered it canceled and the proceeding discontinued.

The order of suspension was entered on protests filed by the New York Central, the Pittsburgh & Lake Erie, the Delaware, Lackawanna & Western and the Erie, who also asked for an investigation of the Baltimore & Ohio practice. The commission declined to include the B. & O. in its investigation, but the report points out that shortly afterward it ordered an investigation of the general subject of co-ordination of motor transportation. The report, by Commissioner Porter, is in part as follows:

In March, 1928, respondent filed a schedule similar in all respects to the one now suspended, except that the former contemplated the free transfer of parties of 10 or more persons instead of 25. When respondent became fully aware of the practices of the B. & O. respondent's president called a conference of railway presidents on April 4 and 5, 1928. The basis of understanding among the railroads represented at the conference was that the B. & O. would so confine its operations as not to deliver passengers at points involving a longer haul in New York than between the Liberty street and 23rd street ferry stations and the regularly established stations, and between Elizabeth and Newark; also that it would not operate busses for the delivery of special parties of any number of passengers at given points even within the limits outlined; and, further, would not handle on regular busses passengers ticketed at other than standard fares. It was also understood that gen-

eral excursions, where all lines participated, would constitute a standard fare. In accordance with that understanding respondent voluntarily withdrew the schedule filed in March, 1928.

Respondent states that the B. & O. did not confine the free transfer service to advertised routes, but received and delivered passengers at various points in Manhattan and Brooklyn which are not on the advertised routes. The suspended schedule is designed to meet the competition resulting from the present practice of the B. & O. in handling groups to points off, beyond, or outside the advertised routes.

Respondent's justification of the proposed schedule is based wholly on the ground of competition and not on its reasonableness *per se*. But for this competition it would consider it unwise and inexpedient to provide such free transfer service because, as applied to the situation in New York, the cost of providing the additional facility and special delivery service would substantially increase operating expenses and decrease passenger revenues, and the service would be likely to spread to other cities.

If the suspended schedule should become effective it would be possible for parties of 15 persons from Washington, 10 from Baltimore, making the required minimum of 25, and an additional 10 from Wilmington, Del., or a total of 35, ticketed individually and not as one party or on a single party ticket, and irrespective of the fare charged, to board the same train at the points mentioned, arrive together at New York and thereby avail themselves of the proposed free transfer service. The intent is that the entire party must travel to the same actual point in greater New York. Respondent's counsel, in brief, construes this provision respecting "traveling together" as not necessarily contemplating that in going to New York they should all originate at the same point or, in traveling from New York, be destined to the same place. Such a provision is plainly lacking in that clarity and definiteness required by our tariff rules, and its policing would be practically impossible. We have consistently condemned as unlawful tariff provisions ambiguous in their terms or largely dependent upon the knowledge or judgment of carriers' agents.

Respondent contends that if the B. & O. is justified in performing free motor coach transfer of passengers without having any tariff on file with us, since that carrier publishes rates to New York it might with equal propriety haul passengers from the Pennsylvania station via motor bus or taxi cab to any place in New York. It also contends that if a rate to New York covers any point on Manhattan Island it should likewise be permitted to transport passengers to their exact point of destination, such a passenger transfer service being analogous, in its estimation, to store-door delivery of freight. The practice proposed by the Pennsylvania would go considerably beyond that of the B. & O., since it would accord free transfer of passengers to and from any point in Manhattan, Bronx, and Brooklyn, three of New York's five boroughs, by whatever means it might deem expedient. The other two boroughs, Queens and Richmond, the former served by respondent's Long Island Railroad, would not be accorded free transfer, although the hauls to and from these boroughs are no greater or more difficult than to and from many points in Manhattan, Bronx, and Brooklyn. We believe that the free transfer of passengers at the base fares to New York contemplated by respondent so as to effect an extension of its terminal facilities into the boroughs of Manhattan, Bronx, and Brooklyn, while failing to effect a like extension of its terminal facilities into the boroughs of Queens and Richmond, would be unduly preferential of the boroughs of Manhattan, Bronx, and Brooklyn, and of passengers to and from those boroughs, and unduly prejudicial to the boroughs of Queens and Richmond, and passengers to and from those boroughs. *Constructive and Off-Track Freight Stations*, 156 I. C. C. 205.

The proposed schedule does not specify the character of service or the kind of equipment to be furnished in connection with the transfer. Respondent's principal witness was unable to state whether busses would be used, allowances be made for taxi cabs, or street railway fares absorbed, but left open the medium by which transfers would be made so that it might be at liberty to provide the character of service in any given case which might best meet the situation. The failure to describe the method of conveyance in the suspended schedule was intentional. Thus, transfer could be made at the New York fare to and from points in Manhattan and Bronx which are served by, and in territory tributary to, the New York Central and New York, New Haven & Hartford, and to and from which respondent's present tariffs publish through fares in excess of the New York fare.

The proposed schedule would tend to disrupt the present fare structure in its relation to New York and other basing points by permitting transfer of passengers at the New York base

fare into higher fare territory. We have frequently announced the principle that a rate once lawfully established continues to be the legal rate until legally canceled, and that a subsequent schedule naming a new rate without canceling the previous rate, can not carry the new rate into lawful effect. *Brown Paper Mills Co. v. Inland Waterways Corp.*, 156 I. C. C. 339. The proposed schedule makes no attempt to cancel the lawfully-published schedules now in effect.

Protestants recognize that the transportation of organized parties of various kinds, such as religious and fraternal, base ball clubs, and convention parties, is a growing and valuable business, actively solicited by them. Nevertheless, they are in accord upon the undesirability of the practice proposed in the suspended schedule, for the reasons that the maintenance of such a competitive service would entail considerably greater expense without compensation by increased traffic, would thus unnecessarily deplete their revenues, and would be likely to spread generally throughout the country. They believe the free transfer service here proposed to be entirely unnecessary under present conditions.

The New York Central points out that if the proposed schedule is permitted to become effective it will be confronted with the necessity of affording like facilities from and to its Grand Central station at 42nd street, and that under the territorial applicability of the suspended schedule there would remain practically no noncompetitive territory between respondent and itself.

The Erie and the Lackawanna terminate at Jersey City and Hoboken, N. J., respectively. These protestants transport their New York passengers either by ferry or through the Hudson and Manhattan tubes. Passengers using the tubes must pay the tube fares. The competition resulting from the present practice of the B. & O. has made it practically impossible for these protestants to secure organized parties for transportation, and if the proposed schedule were permitted to become effective it would serve to emphasize their terminal disadvantage and necessitate the inauguration of a like service, which they are not desirous of establishing because of the attendant decrease in net revenue.

One-Fourth Net Earnings Required for Taxes

WASHINGTON, D. C.

NEARLY one-fourth of their net earnings were paid by the railroads in 1929 in taxes to the various federal, state and local governments, according to a survey of railway taxation just completed by the Bureau of Railway Economics, which covers the period since 1890.

"Taxation in the United States," according to a bulletin issued by the bureau analyzing the results of its survey, "has become a major economic problem; every industry has felt its increasing burden and every industry is devoting attention to its own tax problem. That taxes are rising steadily and growing progressively more burdensome is unquestionable. It is a public and grave problem that demands not only the attention of railway managers, but of every corporation and every citizen as well.

"The total increase in railway taxes, during the nearly two-score years from 1890 to 1928, was from \$31,000,000 to \$412,000,000, an increase of 1,220 per cent. Thus the tax aggregate has been one thing in the railway field that has shown a continuing, and in this case an unfortunate tendency to break all previous records year after year. Because taxes must be paid before net railway operating income is reached in the income account, the mounting railway tax has exerted a definite unfavorable reaction on the amount of that net income.

"During this same period of years, from 1890 to 1928, the United States itself made great strides forward in population, in national wealth, and in imports and ex-

ports. Railway investment, earnings and expenses, and traffic also grew rapidly. But railway taxes grew faster than any of the other factors.

"This rate of increase for railway taxes in the past 38 years was more than 13 times as great as the rate of population growth; nearly three times as great as the rate of increase in national wealth; more than twice as great as the rate of increase in national income; nearly three times as great as the rate of growth in our foreign commerce. It was more than six times as great as the rate of growth in property investment of the railways, two and one-half times as great as the rate of increase in railway gross earnings, and more than three times as great as the rate of growth of net earnings.

"All taxes have been rising in the United States, but railway taxes have run ahead of the general trend. From 1890 to 1928 railway taxes increased 1,220 per cent, while taxes other than those paid by the railways increased 952 per cent. The railway tax growth was more than one-fourth greater than that of the tax bill of other industries and individuals combined.

"By the close of 1929, railway taxes in the United States had mounted to a larger annual aggregate than ever before. Railway taxes were greater, in actual dollars, in that year than in any corresponding period in history. Railway taxation in 1929 absorbed 6.32 cents of each gross dollar received by the railways from transportation operations.

"Not only was railway taxation in 1929 the greatest in amount ever recorded, but it came close to absorbing the greatest proportion of railway gross earnings. The ratio of 6.32 cents of taxes for each dollar of gross earnings in 1929 was only slightly below the corresponding average of 6.37 cents for 1928, and was greater than in any year except 1928 alone.

"Considered in relation to net earnings, railway taxes in 1929 absorbed 22.35 cents of each dollar of net earnings.

"Railway taxes represent a contribution to governmental expenditures, and to various government activities, such as education, police and public protection, the construction and maintenance of highways and waterways.

"Between 1911 and 1929, cash dividends paid to the stockholders of Class I railways increased 23 per cent. During that same period of 18 years, the taxes paid by the railways of Class I increased 302 per cent. That is, railway owners, operating a regulated public service industry, and assuming in addition the risks of general business, received only a 23 per cent increase in their own compensation, compared to an increase of 302 per cent in the amounts their business paid in taxes.

"The ratio of railway taxes to gross earnings has shown a generally upward trend for many years, particularly during the past nine years. This ratio increased nearly two cents per dollar from 1920 to 1929. When it is considered that railway gross earnings exceed six billion dollars per year, it is clear that every additional tax levy equivalent to one cent for each of those dollars means a tax increase of more than \$60,000,000 per year, while an addition of two cents doubles that amount to more than \$120,000,000.

"This is a large increase. So is the tax aggregate a large one, so large that it is difficult for the mind to visualize it. Perhaps it may better be realized when it is stated that the total railway tax bill of \$420,000,000 for 1929 was equivalent to a payment of \$1,150,000 every day, \$47,945 every hour of every day, or \$13.32

every second of every hour, day and night, Sundays and holidays, through the whole 365 days of that year.

"Nearly one-fourth of the property, activities, and traffic of the railways in 1929 were devoted to producing net earnings sufficient to pay the tax on railway property as a whole. That is, 54,000 miles of line with 372,000 employees, 13,300 locomotives, 521,000 freight train cars, 12,000 passenger train cars, and other railway facilities were engaged in producing enough net earnings to enable the carriers to meet their taxation requirements. Considered from another angle, the railroads had to transport 100 billion tons of freight one mile and 7 billion passengers one mile in order to derive net revenues sufficient to meet their tax requirements.

"State and local taxes paid by the railways have increased and are increasing more rapidly than their federal taxes. During the six-year period from 1923 to 1929, the taxes paid to states and other local jurisdictions have shown steady increase year by year, the total increase during the period being more than 20 per cent. Federal income tax rates are now lower than they were in 1923, but the Federal tax bill of the railways in 1929 was 16 per cent greater than in 1923.

"The tide of railway taxes continues to rise, and the annual aggregate has shown little sign of a downward turn. The earlier months of 1930 brought a slight recession in amount, but not in the ratio to gross or net earnings. This decline in the aggregate in 1930 is probably a temporary check, which may soon be offset by later increases.

"In respect to the growing tax burden, the railway industry and other industries have much in common; the tax problem is common to all commercial activities, to the farmer, to the land owner, and to all income producers.

"But the railways operate a publicly regulated industry. Economic laws do not apply in all respects so freely to them as to other industries. The price they charge for their product—transportation—is closely regulated by public authority. Generally speaking, they cannot adjust their rate structure quickly to fluctuations in cost of operation, such as wages or tax rates, prices of supplies, and the like. For this reason, the steady rise in their tax bill brings to the railway industry an economic problem all its own, which demands serious attention and study.

"In the final analysis, this problem is an individual one, each railway company being confronted with special and local conditions which it must meet in its own territory. So far as federal taxes are concerned, railway corporations are taxed on the same basis as other corporations, although even here special conditions often call for special treatment. In the field of local taxation, however, where the bulk of the railway tax is raised and where the complex question of property appraisals and valuations plays an important role, intelligent study and application of sound economic policies is of prime importance."

AN INTERESTING FEATURE of the order for four electric locomotives recently placed with the Westinghouse Electric & Manufacturing Company by the Chilean State Railways is the fact that final negotiations were carried out and the order given by telephone from Santiago, Chile, to New York.

THE UNION PACIFIC announces the completion of the Zion-Mount Carmel highway which will save tourists many miles of distance in going to Zion, Grand Canyon and Bryce Canyon national parks. This highway, which has cost about \$2,000,000 is 24 miles long and includes one tunnel over a mile in length.

November Accidents

THE train accidents investigated by the Bureau of Safety of the Interstate Commerce Commission in the month of November, 1929, numbered nine; 8 collisions and 1 derailment. Following are abstracts of the reports on these accidents:

Toledo Terminal, Tower K, Toledo, Ohio, November 8, 3:38 a.m.—An eastbound Toledo Terminal transfer freight, moving at low speed, ran into the rear of a preceding freight of the Pennsylvania which had been stopped by a signal, and the conductor of the Pennsylvania train was killed; the flagman was injured. The blame is placed on the Toledo Terminal train for running within yard limits not under control. There are no regular passenger trains on this part of the line and the report contains a long discussion about ambiguous flagging rules and uncertain practice in flagging. The company is called upon to see that there shall be one uniform understanding of the rules by all employees "of whatever road" operating over this railroad.

St. Louis-San Francisco, Fickinger, Ark., November 11.—Southbound passenger train No. 103, moving at about 15 miles an hour, or slower, on a side track, collided with freight cars standing there, and 17 persons were injured. The train had entered the siding to meet northbound train No. 104. It was moving on a curve of three degrees to the left and the fireman is held at fault for not keeping a good lookout. It was the practice to notify trains when such sidings were blocked and the report calls attention to the neglect of operators and dispatchers in not doing this. The information came in when one dispatcher was relieving another and the report says there ought to have been better team work in the dispatcher's office.

Pennsylvania, West Philadelphia, November 12, 1:20 a.m.—Westbound first-class express train No. 91, consisting of a locomotive, 19 express cars and a caboose, moving on track No. 17, collided with a switching train on track No. 4 which had moved a very short distance beyond the fouling point and obstructed track 17. The engineer of the switching train was killed. Why he had not stopped soon enough is unexplained. The engineer of No. 91 is also held at fault for not running under proper control while traveling on a yard track. His headlight was dimmed and he did not see the switching train.

Great Northern, Elk Park, Mont., November 12, 7:38 p.m.—Westbound passenger train No. 237, moving at about 25 miles an hour, collided with eastbound locomotive No. 1968, moving backward; the fireman of 1968 was killed and 26 passengers and other persons were injured. The light locomotive, used for helping trains on the grade, had encroached on the time of the passenger train without right; either because the engineer's watch was wrong or it was mis-read by him. Had a block signal system been in service, this accident would not have occurred, says the report.

Great Northern, Willmar, Minn., November 15, 3:22 a.m.—Eastbound passenger train No. 52 of the Third Subdivision, approaching the junction with the Second Subdivision, was not stopped until after the locomotive fouled the Second Subdivision main track; and it was struck by passenger train No. 10 of the Second Sub-

division and the locomotive of 52 was overturned. The engineman having been killed it was impossible to say why he did not stop clear of the switch. His engine set an automatic signal against train No. 10, but not in season to stop it.

Baltimore & Ohio, and Chicago, Indianapolis & Louisville, Roachdale, Ind., November 15.—Eastbound passenger train No. 49 of the Baltimore & Ohio, moving slowly over the crossing of the C. I. & L. (Monon route) was run into at the side by a northbound freight of the C. I. & L., moving very slowly. The tracks at the crossing lie at right angles to each other. The cafe car in the B. & O. train was overturned and badly damaged and four passengers and five employees in this car were injured. The engineman of the freight had failed properly to control his speed. The inspector finds that the brake equipment of this freight train was adequate and no unusual conditions were present. This crossing has no interlocked signals, the only signal being a crossing gate which may be swung first across one road and then across the other. The line of the C. I. & L. has automatic block signals, but at the crossing there is a dead section in the track and the obstruction of the crossing by the B. & O. train has no effect on the automatic signals. If, says the report, the crossing gate had been connected with the signal system so as to display stop indications, it is possible that the engineman would have realized his danger sooner.

Central of New Jersey, Treichler, Pa., November 23, 5:56 a.m.—A long eastbound freight train, CU-2, moving slowly out of a side track, immediately following passenger train No. 102, was run into, at the side, near the front end, by another long freight train, traveling in the same direction and still moving at about 30 miles an hour; and two trainmen were injured. The switch at which train CU-2 left the siding is a spring switch and the train had started out without changing the switch stand. This resulted in the main track being fouled a few seconds before the automatic signal, which should have stopped the oncoming freight on the main line, had moved to the stop position; that is to say, the second train received no stop signal until after

it had got within a few hundred feet of the point of danger. The conductor of train CU-2 was on the locomotive, and both he and the engineman are held responsible for not having provided adequate flag protection before moving out of the side track. The train dispatcher had given permission by telephone for the freight to move out of the side track immediately following the passenger train, thinking that the other freight would not reach that point before 6:02 or 6:04. The flagman of CU-2, in the caboose, had done nothing to signal the other freight because he did not hear the whistle signal of his own locomotive which indicated that the train was about to start.

Colorado & Southern, Garcia, N. M., November 24.—A southbound freight train consisting of locomotive, 43 cars and a caboose, moving at between 15 and 35 miles an hour, was derailed on a curve of five degrees and 19 cars were badly wrecked. The fireman was killed and one other employee was injured. The inspector holds that the speed limit of 20 miles an hour had been exceeded, and probably greatly exceeded.

Chicago, St. Paul, Minneapolis & Omaha, Sibley, Iowa, November 30, 8:20 p.m.—Eastbound freight train No. 20, passing Sibley without having a train order which had been sent to that point for it, collided with westbound freight train No. 19, both trains moving at good speed. The locomotives and several cars were wrecked and the engineman and one brakeman of No. 19 were killed; four employees were injured. The signalman at Sibley had mislaid the order, Form 31, having it covered by other papers, and he delivered to the train another order, Form 19, forgetting that the first-mentioned order was on his desk. He delivered to No. 20 a caution card but without properly entering on the card the numbers of certain train orders. Investigation showed that caution cards not properly filled out had often been issued. Conductors and enginemen had been careless in accepting these irregular orders and in this case the dispatcher ought to have refrained from authorizing the issuance of the caution card until the order outstanding at Sibley had been signed for.

* * * *



Lumber Stock on the Northern Pacific at Tacoma, Wash.

Freight Car Loading

WASHINGTON, D. C.
REVENUE freight car loading in the week ended July 5, which included a holiday, amounted to 792,141 cars, a decrease of 119,002 cars as compared with the corresponding week of last year and a decrease of 58,806 cars as compared with 1928. All classes of commodities showed reductions as compared with last year and all except grain and grain products showed reductions as compared with 1928. Also all districts reported reductions as compared with both years. The summary as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading			
Week Ended Saturday, July 5, 1930			
Districts	1930	1929	1928
Eastern	173,328	202,160	192,411
Allegheny	161,416	194,379	172,379
Pocahontas	41,930	46,555	44,204
Southern	105,275	118,932	118,925
Northwestern	122,695	143,366	126,301
Central Western	122,837	136,294	125,233
Southwestern	64,660	69,457	71,494
Total Western Districts	310,192	349,117	323,028
Total All Roads	792,141	911,143	850,947
Commodities			
Grain and Grain Products	48,204	52,524	43,289
Live Stock	16,694	20,283	20,256
Coal	109,729	120,133	114,971
Coke	8,555	11,884	9,058
Forest Products	36,173	50,116	47,443
Ore	56,033	66,789	57,018
Mdse. L. C. L.	204,837	224,368	221,508
Miscellaneous	311,916	365,046	337,134
July 5	792,141	911,143	850,947
June 28	936,848	1,096,569	1,003,699
June 21	920,859	1,069,874	987,360
June 14	926,093	1,069,670	1,002,813
June 7	935,647	1,055,768	995,570
Cumulative total, 27 weeks..	23,999,447	26,528,096	25,312,720

The freight car surplus for the week ended June 30 averaged 465,464 cars, including 246,622 box cars, 163,396 coal cars, 28,458 stock cars and 13,901 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended July 5 totaled 55,015 cars, a decrease of 8,043 cars from the previous week and a decrease of 8,609 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
July 5, 1930	55,015	28,256
June 28, 1930	63,058	30,101
June 21, 1930	63,830	30,918
July 6, 1929	63,624	36,232
Cumulative Totals for Canada		
July 5, 1930	1,583,728	950,761
July 6, 1929	1,770,184	1,144,778
July 7, 1928	1,724,121	1,057,408

EMPLOYEES OF THE PENNSYLVANIA, under the recent offer of stock made to them by the directors of the company, handed in subscriptions for over 500,000 shares, or for about 50 per cent more than the total number provided by the offer.

"ROBOT OF THE RAILS" is the name given by the Baltimore & Ohio to its automatic train control, and a circular has been issued reminding the public that this refinement in safeguards is in use on the company's line between Philadelphia and Washington, 127 miles; and that this installation has cost \$412,000. "Safety above everything else," it is pointed out, has long been the watchword of the Baltimore & Ohio, and this additional means of keeping up that ideal costs the company \$85,000 a year.

Looking Backward

Fifty Years Ago

The Wabash, St. Louis & Pacific [now the Wabash] on July 25 will place in operation a fast passenger train which will cover the distance between St. Louis, Mo., and Omaha, Neb., in 14 hours. The schedule time between those two cities is now about 20 hours and the distance is 412 miles.—*Railway Age*, July 22, 1880.

The Chicago & North Western is rapidly pushing a line toward the Black Hills of Dakota: In June of last year a corps of engineers were started in the field west of Tracy, Minn., 530 miles northwest of Chicago. Today it has finished and is operating 140 miles west of that point to Huron, Dakota, with the expectation of early completion to Fort Pierre, on the right bank of the Missouri river, about 120 miles beyond Huron. The new town on the east bank of the Missouri, Pierre, has been built on land originally purchased and laid out by the North Western.—*Railway Age*, July 22, 1880.

Twenty-Five Years Ago

The Esquimalt & Nanaimo, which was recently purchased by the Canadian Pacific, has been formally taken over by the latter company. As a result of the transfer a million and a half acres are added to the land holdings of the Canadian Pacific.—*Railway and Engineering Review*, July 22, 1905.

The Michigan Central has brought suit against the State of Michigan for \$6,000,000 damages alleged to have been sustained by the repeal of the company's special charter in 1900. The railroad complained that the increased taxes levied against it by the state through repeal of the charter were equivalent to the taking of property without due process of law.—*Railway Age*, July 21, 1905.

The Lake Shore & Michigan Southern has placed in service two ten-coupled switching locomotives, which, with the exception of a Mallet of the Baltimore & Ohio and a number of Shay geared locomotives, are the heaviest on driving wheels of any locomotives in existence. These locomotives will be used in gravity yards to drill cars over the humps and have a maximum tractive effort of 55,352 lb., bearing a ratio to adhesive weight of 1 to 4.8.—*Railway Age*, July 21, 1905.

Ten Years Ago

As a result of a hearing held before it on July 8, 9 and 10, the Interstate Commerce Commission on July 13 issued a service order extending the priority of use of open-top cars for bituminous coal loading east of the Mississippi river until August 20. To meet the complaints of steel and ore shippers the new order excludes flat bottom gondola cars with sides less than 36 in. in height. It was also provided that an embargo shall be placed against the consignment of open-top cars to any consignee who fails or refuses to unload coal cars within 24 hours.—*Railway Age*, July 16, 1920.

The Detroit, Toledo & Ironton has been purchased by Henry Ford of Detroit, Mich., and the control of the road was taken over by him on July 9. The purchase price was \$5,000,000, subject to \$1,800,000 of first mortgage and car trust bonds. The Ford interests, in announcing the purchase, said:

"Mr. Ford, for some time past, has been devoting much of his time to a fundamental study of the engineering and mechanical problems involved in railroading, and, with the large means at his disposal and his own genius along lines of large production, interesting developments may well be looked for."—*Railway Age*, July 16, 1920.

Communications and Books

Railroading and College Men

SOLDIERS FIELD
BOSTON, MASSACHUSETTS.

TO THE EDITOR:

I am in agreement with by far the greater part of Mr. Gormley's able article, in your June 21 issue on railroading as a career for college men, although I still believe that the factors which favor a system of some kind, cadet or otherwise, have more weight than the factors which condemn it. Unfortunately Mr. Gormley missed an important part of the plan I proposed before the New York Railroad Club, February 18, 1927. My suggestion was that the cadet corps should be divided in fairly equal proportions between college men then taken into service and eligible non-college men already in the service and, further, that vacancies in official positions be filled in approximately equal proportions from cadet course graduates and eligible men who were without that special training but who under the usual procedure would be considered. Mr. Gormley overlooked the second proviso. The college men recruited for the cadet course would be but one-half of the cadet corps and but one-quarter of those eventually chosen for official positions. Discrimination or preferment to that small group it may be, but not in the degree indicated by Mr. Gormley.

Whether the responsibility for the situation rests with the young men themselves or with the railroad management the fact is that ambitious young men, attracted to railroad work by its interesting features, are keeping out of it because of the clear prospect of slow advancement and a belief, that may or may not be well founded, that most railroad officers look upon college training with suspicion. In nearly every case when a young man comes to me to talk over the possibilities in the railroad field he begins with the statement, "Railroading appeals to me but all of my friends and advisors warn me strongly to shy away from it."

The record of railroad management since the war speaks volumes on the ability and resourcefulness of railroad officers. On frequent occasions I have paid warm tribute to their achievements. It is true, nevertheless, that achievement in even greater degree is shown in other lines of corporate activity and my observation is that the corporations which have a definite policy in the matter of recruiting regularly each year a small number of the most promising graduates are numbered among the group of outstanding business enterprises. They would not continue that policy unless its wisdom had been demonstrated by experience.

It may be true, as Mr. Gormley states, that "railroads have for a number of years been increasingly particular as to the class of men taken into service," but in my opinion there is need for much greater care in selection than is now practiced in the typical case.

WILLIAM J. CUNNINGHAM,

Professor of Transportation, Harvard Graduate
School of Business Administration.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth O. Cullen, Reference Librarian,
Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The A B C of Railroad Consolidations, by Milton W. Harrison. Appendices include list of railroad affiliations approved and authorized by the Commission since 1920, list of railroads with their present affiliations, and a list showing allocation by the Commission in the consolidation decision. 59 p. Pub. by National Association of Owners of Railroad and Public Utility Securities, Inc., New York City. *Apply*.

A Brief Survey of Railway Taxation. Includes "Railway taxes compared with the general trend of taxation in the United States, 1890 to 1928," "Statistics of railway taxes, 1911-1929," ratios of taxes to railway property investment, railway gross earnings, and railway net earnings, 1911-1929, classification of railway taxes, taxes in the United States and Canada, and discussion of taxation trends. Bulletin, Special Series No. 54. 28 p. Pub. by Bureau of Railway Economics, Washington, D. C. *Apply*.

Economics of World Peace, edited by Thorsten Sellin and Donald Young. Especially Part II "International Transportation and Communication" p. 25-52, and the discussions of transportation in the appendix "Economic tendencies affecting the peace of the world" by Professors J. Bonn of Berlin, and André Siegfried of Paris, p. 192-222. Annals of the American Academy of Political and Social Science for July 1930. 324 p. Pub. by the American Academy of Political and Social Science, Philadelphia, Penna., \$2.

Personenkraftwagen, Kraftomnibus und Lastkraftwagen in den Vereinigten Staaten von Amerika, by Emil Merkert. A study and evaluation of the effect on American living of the extensive use of motor cars, motor coaches and motor trucks, with some reference to the special effect on railroads and on highway development. The author is a keen and sympathetic observer and in preparing for this study spent two years in this country, part of the time consulting authorities and the rest of it literally "out on the road." 356 p. Illustrations. Pub. by Julius Springer, Berlin, Germany, RM 29.50.

Studies in Securities 1930—Fourth Issue. "Securities even as humans have character to those who know them. In such brief reviews of large companies naturally only the outstanding points in their past histories and current positions can be touched on, and thus we have chosen to present only what appear to us as the accomplishments in the past and evidences in the present which enable one to judge the character of their securities." Foreword. Twenty-one railroads and the Pullman Company are included. 135 p. Pub. by Jas. H. Oliphant & Co., New York City. *Apply*.

Periodical Articles

International Container Competition—Contest at International Chamber of Commerce, Paris. "The problem is to find the most practical method of through transport of goods by sea, rail and highway, with a view to suppressing as far as possible costs of packing, storage and sorting and to enable goods to be carried from the place of production to the place of consumption in the most rapid and economical manner." Packing-Shipping, July 1930, p. 25-26.

Railroad Consolidations and Railroad Employees, by W. Jett Lauck. "An acceptable procedure for consolidation" p. 4. Brotherhood of Locomotive Firemen and Enginemen's Magazine, July 1930, p. 3-5.

Railroad Problem Solution Seen in Adaptation of Rail-Plane, by H. H. Sheldon. "Monorail system constructed over present roadways would double train facilities at moderate cost and provide means of high speed transportation." "The feature exhibit at the Transport Congress to be held in Glasgow this month will be the new rail-plane, invented by the Scotch engineer George Bennie." New York Herald-Tribune, July 6, 1930, Section 4, p. 1. (Illustrated).

Roads Surpass Pledge to Hoover, by Dr. Julius H. Parmelee. "At the National Business Survey Conference of December 5, 1929, the railways made a definite forecast as to their capital program for 1930, and as to their capital expenditures for the first two quarters of the present year. *** Returns for the first quarter of 1930 are now available, and show that the railways thus far this year have more than fulfilled expectations." Savings Bank Journal, July 1930, p. 7-8.

Odds and Ends of Railroading

Pullman Recognizes the Medical Fraternity

The two new composite Pullman cars for invalids on the North Western's Rochester-Minnesota Special between Chicago and Mankato, Minn., have been named for an eminent English and an American physician. The Englishman, Joseph Lister, is noted for his introduction in 1860 of the antiseptic system of treatment called "listerism." Ephraim McDowell, a Virginian of the early nineteenth century, is known as the father of ovariectomy.

A Platform for Eternity

Under the above heading a German magazine, according to the Railway Gazette, recently published an item concerning a man who collapsed and died just as he was about to step into a train at a Silesian railway station. His widow applied to the State Railways Administration for a refundment of the money paid for the unused ticket. The railway refunded the money—less ten pfennigs (two cents) charged for her husband's use of the platform.

Katy Champion

H. E. McGee, recently elected executive vice-president of the Missouri-Kansas-Texas, is not merely an outstanding railroader. Only a few years ago, he took up golf for the first time. With the thoroughness which characterizes all his undertakings, Mr. McGee was soon playing an extremely good game, so good, in fact, that he recently won the M-K-T championship. His opponent in the finals was the redoubtable Walter Walthall, executive general agent at San Antonio, and one of the foremost golfers in Texas.

An Artistic Railroader

R. C. Bonebrake, locomotive painter on the Chicago, Rock Island & Pacific at Goodland, Kan., is a self-educated artist as well. He has fitted up one room of his home as a studio and spends much of his spare time there painting accurate scale pictures of Rock Island locomotives. His latest accomplishment is a picture of a Rock Island 5000-class locomotive, painted on linen from a small photograph of the actual locomotive. With a scale of one inch to a foot, the size of the locomotive in the painting is 6 ft. 4¾ in. by 14 in.

Another Railroad Beauty

PADUCAH, KY.

TO THE EDITOR:

In a recent issue there was an item regarding Miss Ethel McFadden, daughter of Eugene McFadden, engine carpenter for the Louisville & Nashville, representing "Miss Tennessee" in the National Bathing Beauty contest at Miami. Miss Irene Doyle of Paducah, who was "Miss Kentucky" in this same contest, is the attractive daughter of John W. Doyle, conductor on the Nashville, Chattanooga & St. Louis.

ELENORA MOSS,
Accounting Department,
Nashville, Chattanooga & St. Louis.

French Passenger Service

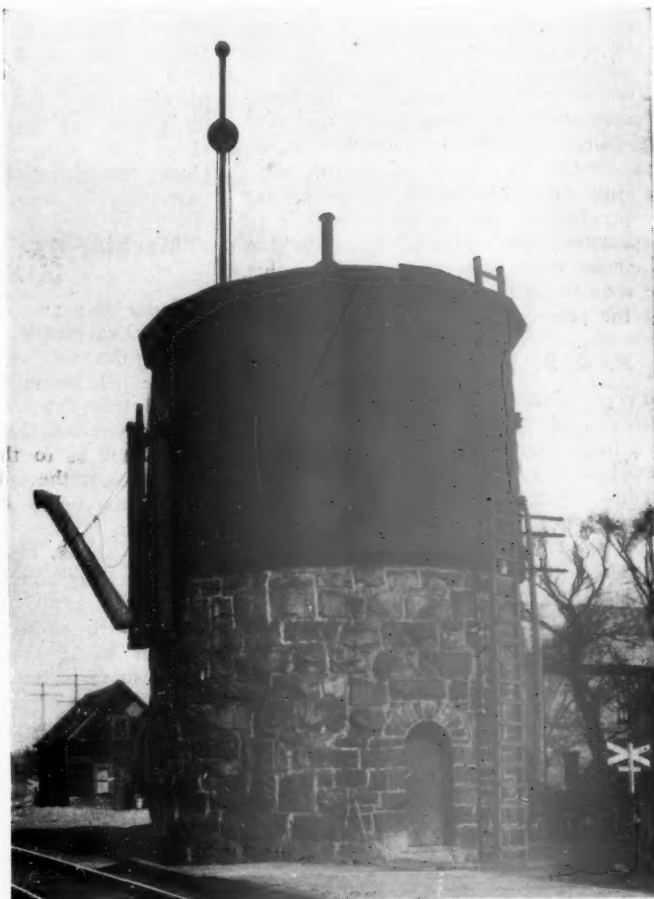
The various French railways operate some excellent and fast through trains. The new train, inaugurated on May 1, between Paris and Liège, Belgium, for example, is probably the world's fastest. It makes the 467-kilometer run in four hours, an average of 116.75 kilometers, or about 73 miles an hour. There is one thing, however, in which the French trains are lacking, and that is adequate provision for smokers. This despite the fact that the percentage of men and women smokers is probably higher in France than in the United States. Only one small compartment is provided in each car for smokers, the rest of the lovers of nicotine being required to stand in the narrow corridor to indulge

in their habit. The result is that these corridors are usually jammed with people. This, coupled with the fact that French passengers wander up and down the length of the train at frequent intervals for no apparent reason, creates a considerable traffic problem in the corridors. The conductor, or passengers going to or coming from the diner, literally have to fight their way through the jam. Everyone is cheerful and good-tempered about it, but it is a nuisance, none-the-less.

Another extremely noticeable thing is the difference between the character and the appearance of French conductors. Taken as a whole, they are extremely good-tempered and efficient. They are polite and attentive, and patient with those who do not speak the language. These good points, though, are offset by their appearance. Their uniforms are old and dirty, usually with buttons missing. Most of them have two or three days stubble of beard on their faces and their hands are seldom clean. If only they paid some attention to their appearance, they would be among the most efficient in the world, for they have a positive genius for courtesy; but their unkempt condition spoils the otherwise excellent effect.

An Old Water Tank

One of the last of the wood and stone water tanks on Canadian railways, this structure which stood at Fredericton Junction, N. B., on the Canadian Pacific was recently dismantled to permit the erection of a new steel and concrete



tank. The old tank, built in 1898, was of cedar on a sub-structure of stone and had a capacity of 40,000 gal. A tank similar to the one pictured here still stands at Harvey, N. B., and is now the only one remaining on the Canadian Pacific.

NEWS of the WEEK



A 62-Car Strawberry Train on the Boston City Southern at Grand Central Station

THE NEW YORK RAILROAD CLUB will hold its annual golf tournament at the Winged Foot Golf Club, Mamaroneck, N. Y., on August 12.

THE HEADQUARTERS of the engineering department of the Seaboard Air Line, now located in Savannah, Ga., will be moved to Norfolk, Va., about August 1.

THE GENERAL OFFICES of the Boston & Maine which, for the past four years, have been located at Lechmere square, have now been moved back to Causeway street, Boston, Mass. These office forces, numbering about 1,300 persons, are now settled on the eighth, ninth and tenth floors of the new North Station building.

THE ALTOONA, PA. SHOPS of the Pennsylvania are to be closed during the week beginning July 28, as a result of an arrangement by which all lay-off days for July have been consolidated, so far as practicable, during that week. In preparation for this lay-off, working schedules have been rearranged so that the required output will be obtained during the preceding days of the month.

P. & S. Begins New Year

Preparations for the work of the Purchases and Stores division, A.R.A., have begun for the year 1930-1931 with the appointment of G. E. Scott, purchasing agent of the Missouri-Kansas-Texas, as chairman of the Committee on Committee Programs. The assignment of committee work and the selection of other committee members is already well under way.

Wage Statistics for April and May

Class I railways reported to the Interstate Commerce Commission a total of 1,572,566 employees as of the middle of the month of April. The total compensation was \$225,760,235. Compared with the returns for the corresponding month of last year this shows a decrease in the total number of employees of 93,034, or 5.59 per cent, the total compensation shows a decrease of 6.41 per cent. The commission has also issued its preliminary statement for May show-

ing a total of 1,601,494 employees, a decrease of 6.59 per cent as compared with May, 1929, and a decrease of 6.33 per cent as compared with May, 1928.

Dustless Road Beds

Oil to the amount of 530,000 gallons has just been spread on road beds of the Boston & Maine, this treatment being applied to all of the important lines of the company which are not already rock-ballasted. The principal lines already rock-ballasted are those from Boston to Portland (western route) and North Berwick to Portland (eastern route); and most of the main line from Boston, Mass., to Johnsonville, N. Y. The last named section will be completely rock-ballasted this year. The oil which has just been spread covers about 1,000 miles of line which total includes main passenger lines and the more heavily traveled branches.

"Machine Age" to be Portrayed in Exhibit

Under the auspices of the Museums of the Peaceful Arts, an exhibition depicting the rise of the "machine age" will be held from September 12 to November 15 in the News building, 220 East Forty-Second street, New York. The exhibit will be divided into three periods, representing respectively machine developments up to the middle of the eighteenth century, the period from that time to about 1900, and developments since the beginning of the present century. The main objectives of the exhibition will be to present the physical agencies of the machine age, the most significant industrial advances which these have brought about and the social and economic significance of these technological improvements.

Grade Crossing Elimination in New York State

A total of 932 proceedings, involving the elimination of 1,561 railroad grade crossings in New York state, outside of New York city, have been started by the Public Service Commission of New York since the elimination of such crossings was begun under the present law,

by which the railroad pays 50 per cent of the cost of elimination, the state, 49 per cent, and the county or municipality in which the crossing is located, 1 per cent. A report of the work up to July 1 of this year shows that the commission has held a total of 2,355 hearings on grade crossing cases; has approved the completed work in 417 projects involving the elimination of 540 crossings, and has issued 453 additional orders for the elimination of 792 more crossings, on which work, estimated to cost more than \$108,000,000, is in progress or about to begin.

Tank Car Braking Power Adjustment

A circular No. D.V.-697, recently issued by the American Railway Association, Mechanical Division, calls attention to the generally improved condition of brake power on existing tank cars and states that, owing to the fact that Section H of Interchange Rule 3, has been adopted covering brake power for all freight cars, the provision of circular S-3-2, issued May 15, 1919, covering the adjustment of brake power on existing tank cars is abrogated. The circular further states that the brake power on existing tank cars should be made to conform to the standard adopted in 1924 on all cars built new and on cars rebuilt after March 1, 1925, in accordance with the provision of Section H of Interchange Rule 3.

New York Railroad Club Annual Outing

The New York Railroad Club held its annual outing on July 10, and about 620 members and their guests were present, the steamer "Alexander Hamilton" of the Hudson River Day Line having been chartered for the occasion.

The steamer left pier 81 at the foot of West Forty-Second street, New York, at 1 p.m. and from that time until dusk cruised continuously on the Hudson river. No landing was made from the time the boat sailed until she docked at 9:30 p.m. A buffet luncheon was served and a dinner at 6:30 p.m.

The entertainments provided for the visitors were many and varied including deck sports, and for golf enthusiasts

there was an outdoor obstacle golf game of pitch and putt; while long drivers were invited to show their prowess on the golf driv-o-meter. Other games included ring toss, Bristle target practice, deck and shuffle board, cane toss, a kiddy-kar race, a horse race conducted on the pari-mutual system, cards, etc., the order of the day being to round up one's own party and play as one pleased.

Music was furnished by the Blue Comet Band from Wilkes-Barre, Pa., by courtesy of the Central of New Jersey, which band throughout the cruise furnished lively tunes and added color with their dashing blue uniforms. Frank Hedley, president of the Interborough Rapid Transit, acted as master of ceremonies and song leader.

Among the winners of the prizes

consisting of golf bags, traveling kits, clocks, canes, etc., were: George W. Galloway, vice-president B. & O.; H. H. Vreeland, chairman, executive committee, New York Railroad Club; C. C. Hubbell, purchasing agent of the D. L. & W.; W. C. Gove, Brooklyn-Manhattan-Transit; George Le Boutillier, vice-president, Long Island and the Pennsylvania; James Egan, stationmaster,

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from the Monthly Reports of Revenues and Expenses for 172 Steam Railways, Including 16 Switching and Terminal Companies.

FOR THE MONTH OF MAY, 1930 AND 1929

Item	United States		Eastern District		Southern District		Western District	
	1930	1929	1930	1929	1930	1929	1930	1929
Average number of miles operated	242,413.07	242,352.02	60,218.67	60,083.10	46,097.11	46,078.10	136,097.29	136,190.82
Revenues:								
Freight	\$354,326,129	\$412,769,529	\$158,187,008	\$185,288,695	\$64,603,556	\$74,438,817	\$131,535,565	\$153,042,017
Passenger	a 60,405,593	b 68,906,502	33,556,202	37,056,900	7,515,384	8,895,826	19,334,007	22,953,776
Mail	9,323,851	c 11,663,135	3,637,748	5,039,197	1,564,510	1,693,156	4,121,593	4,930,782
Express	12,221,290	14,466,932	5,410,190	6,192,209	2,079,212	2,580,375	4,731,888	5,694,348
All other transportation	15,698,358	18,407,002	9,427,751	10,933,117	1,073,381	1,300,117	5,197,226	6,173,768
Incidental	10,375,977	11,692,397	5,445,902	5,985,830	1,344,305	1,357,878	3,585,770	4,348,689
Joint facility—Cr.	1,214,834	1,031,144	451,987	351,465	219,747	168,632	543,100	511,047
Joint facility—Dr.	435,952	328,246	199,566	88,422	30,209	36,339	206,177	203,485
Railway operating revenues	463,130,080	538,608,395	215,917,222	250,758,991	78,369,886	90,398,462	168,842,972	197,450,942
Expenses:								
Maintenance of way and structures	70,758,344	80,247,425	28,737,982	32,730,704	11,415,310	13,073,836	30,605,052	34,442,885
Maintenance of equipment	90,500,738	104,038,796	42,136,075	49,456,570	16,296,429	18,145,742	32,068,234	36,436,484
Traffic	11,300,049	11,372,437	4,243,476	4,249,662	2,029,428	2,092,128	5,027,145	5,030,647
Transportation	159,565,465	175,778,030	75,631,843	83,885,541	25,811,657	28,270,972	58,121,965	63,621,517
Miscellaneous operations	4,424,355	4,752,026	2,138,062	2,179,415	476,058	488,330	1,810,235	2,084,281
General	16,426,603	16,507,868	7,089,186	7,165,183	2,758,298	2,800,611	6,579,119	6,542,074
Transportation for investment—Cr.	1,195,211	1,168,141	216,782	273,385	94,252	97,235	884,177	797,521
Railway operating expenses	351,780,343	391,528,441	159,759,842	179,393,690	58,692,928	64,774,384	133,327,573	147,360,367
Net revenue from railway operations	111,349,737	147,079,954	56,157,380	71,365,301	19,676,958	25,624,078	35,515,399	50,090,575
Railway tax accruals	31,210,388	33,934,807	13,795,336	15,053,824	5,642,963	6,181,030	11,772,089	12,699,953
Uncollectible ry. revenues	84,454	94,047	27,921	26,018	18,055	21,126	38,478	46,903
Railway operating income	80,054,895	113,051,100	42,334,123	56,285,459	14,015,940	19,421,922	23,704,832	37,343,719
Equipment rents—Dr. balance	8,312,466	7,561,347	4,179,023	4,196,748	393,618	282,425	3,739,825	3,082,174
Joint facility rent—Dr. balance	2,568,706	1,912,194	1,397,565	937,179	271,254	157,595	899,887	817,420
Net railway operating income	69,173,723	103,577,559	36,757,535	51,151,532	13,351,068	18,981,902	19,065,120	33,444,125
Ratio of expenses to revenues (per cent)	75.96	72.69	73.99	71.54	74.89	71.65	78.97	74.63

FOR FIVE MONTHS ENDED WITH MAY, 1930 AND 1929

Average number of miles operated	242,465.07	242,279.85	60,239.82	60,085.58	46,114.16	46,105.17	136,111.09	136,089.10
Revenues:								
Freight	\$1,710,592,168	\$1,931,715,772	\$749,588,622	\$849,670,828	\$327,865,930	\$363,465,753	\$633,137,616	\$718,579,191
Passenger	e 313,498,069	f 351,726,622	168,742,639	183,054,874	47,063,951	54,478,762	97,691,479	114,192,986
Mail	46,400,049	g 50,666,064	17,691,125	19,677,705	7,844,834	8,063,397	20,864,090	22,924,962
Express	50,541,997	60,343,208	22,713,622	27,812,951	8,290,170	10,354,599	19,538,205	22,175,658
All other transportation	74,505,273	85,792,457	42,991,107	48,610,130	6,033,126	6,655,430	25,481,040	30,526,897
Incidental	47,051,571	51,126,608	24,597,854	26,443,512	7,156,616	7,427,240	15,297,101	17,255,856
Joint facility—Cr.	5,526,875	5,167,637	1,835,930	1,735,884	983,672	786,265	2,707,273	2,645,488
Joint facility—Dr.	1,681,732	1,610,203	516,014	410,700	164,242	173,229	1,001,476	1,026,274
Railway operating revenues	2,246,434,270	2,534,928,165	1,027,644,885	1,156,595,184	405,074,057	451,058,217	813,715,328	927,274,764
Expenses:								
Maintenance of way and structures	308,748,223	334,577,360	126,297,141	136,326,897	58,078,569	63,799,412	124,372,513	134,451,051
Maintenance of equipment	460,719,540	502,686,743	213,929,548	238,723,979	83,529,400	88,341,800	163,260,592	175,620,964
Traffic	55,264,458	53,107,002	21,173,726	19,804,704	10,296,017	10,119,311	23,794,715	23,177,987
Transportation	813,798,042	877,026,410	384,560,903	412,824,572	133,198,402	143,528,752	296,038,737	320,673,086
Miscellaneous operations	22,798,754	23,467,836	10,856,281	10,919,334	3,123,947	3,099,388	8,818,526	9,449,114
General	82,345,178	80,679,277	36,004,510	34,752,010	13,843,609	13,835,912	32,497,059	32,091,355
Transportation for investment—Cr.	5,158,641	4,544,197	978,988	957,441	493,093	407,998	3,686,560	3,178,758
Railway operating expenses	1,738,515,554	1,866,995,431	791,843,121	852,394,055	301,576,851	322,316,577	645,095,582	692,284,799
Net revenue from railway operations	507,918,716	667,932,734	235,801,764	304,201,129	103,497,206	128,741,640	168,619,746	234,989,965
Railway tax accruals	149,690,334	162,544,884	61,199,857	67,181,264	29,702,999	31,267,482	58,787,478	64,096,138
Uncollectible ry. revenues	446,388	494,440	188,831	200,070	72,549	102,793	185,008	191,577
Railway operating income	357,781,994	504,893,410	174,413,076	236,819,795	73,721,658	97,371,365	109,647,260	170,702,250
Equipment rents—Dr. balance	39,386,674	37,827,627	20,108,217	20,411,429	1,619,353	1,534,967	17,659,104	15,881,231
Joint facility rent—Dr. balance	10,735,777	10,048,539	5,406,727	4,988,869	1,069,860	883,059	4,259,190	4,176,611
Net railway operating income	307,659,543	457,017,244	148,898,132	211,419,497	71,032,445	94,953,339	87,728,966	150,644,408
Ratio of expenses to revenues (per cent)	77.39	73.65	77.05	73.70	74.45	71.46	79.28	74.66

a Includes \$2,864,547 sleeping and parlor car surcharge. b Includes \$3,236,263 sleeping and parlor car surcharge. c Includes approximately \$2,248,708 back mail pay. d Includes \$15,227,982 sleeping and parlor car surcharge. e Includes \$16,327,014 sleeping and parlor car surcharge. f Includes approximately \$4,351,355 back mail pay. g Includes approximately \$4,351,355 back mail pay.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Pennsylvania; J. S. Doyle, Sr., Interborough; E. M. Herr, vice-chairman, Westinghouse Electric & Mfg. Co., and George F. Mand, assistant secretary, American Car & Foundry Company. On Tuesday, August 12, the Railroad Club will hold a golf tournament in the vicinity of New York.

Central Vermont Again Collects Crossing Damages

For the second time in as many months the Central Vermont has turned the tables on a careless motorist, when H. H. Powers, attorney for the railway, announced settlement out of court of the railway's claim against George H. Smith of West Berlin, Vt., whose automobile collided with a Central Vermont locomotive on a grade crossing north of Riverton, Vt. The railway contended that Mr. Smith drove his car onto the tracks in front of the locomotive in spite of the fact that bell and semaphore signals protecting the crossing were operating perfectly and that the locomotive crew had signaled the approach of the train by whistle and bell. Although the driver escaped without injuries, his automobile was badly damaged, while the cost of making minor repairs to the locomotive was estimated at \$19.60, which sum has been collected by the Central Vermont from Mr. Smith's insurance company.

Single Occupancy Sections Popular

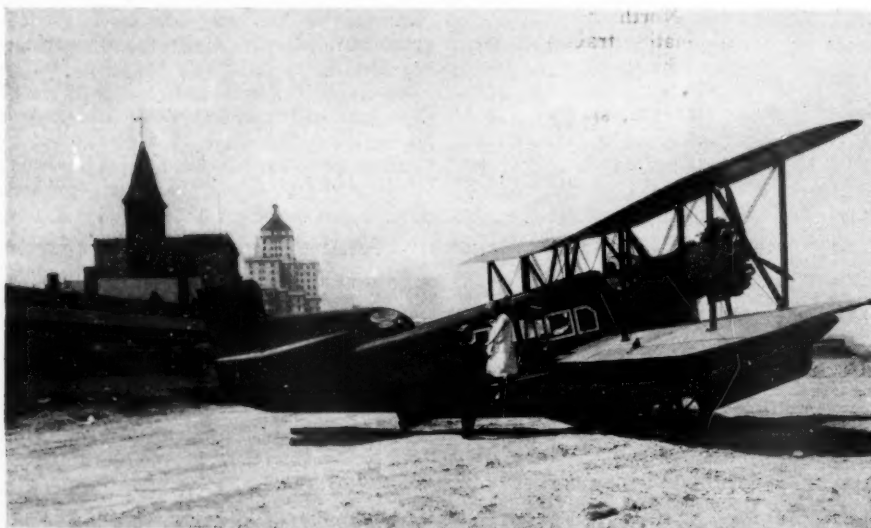
The sale of single occupancy sections by the Pullman Company since May 1, when reduced rates were placed in effect, has steadily increased. The latest reports, received on June 20 by the passenger department, indicate that the combined work of the conductors, porters and ticket agents has resulted in the sale ratio of 11 to 2 as compared with the same period of 1929. For the first 20 days of May the conductors sold 1,065 sections, while for the same number of days in June the total was 7,431 or nearly seven to one. In the same period of June, 1929, the sales numbered but 150.

For the first 20 days in May, ticket agents sold 6,047 sections while in the corresponding days in June they sold 12,232 or about 2 to 1. A year ago the same days in June showed 4,200 or about one-third.

The increasing sale of single occupancy sections is due to the efforts of conductors, agents and porters who have used many inducements. One conductor had his porter make down sections for single occupancy with the uppers put away and as a result converted 51 sales of lowers into single occupancy sections on a trip from Chicago to Los Angeles and return. On another occasion he sold 17 sections within five hours of leaving Chicago enroute to the coast. Another conductor sold 20 sections on the Erie Limited from Chicago to New York while still another sold 200 on the Motor City during June, one trip netting 27.

North Western Rail-Air Service

The Chicago & North Western, in conjunction with the Kohler Aviation Corporation, inaugurated on July 12 a rail-air service between Chicago and points in the Northwest to points in Michigan and the East. This service makes use of the North Western's station on Lake Michigan at Milwaukee, Wis., immediately adjacent to the Maitland airport. Between Chicago and Grand Rapids, Mich., via Milwaukee and the flight across Lake Michigan, the new schedule provides for an elapsed time of three hours and 25 minutes, about two hours shorter than the all-rail route. Between Minneapolis, Minn., St. Paul and Duluth and other points northwest of Chicago, it is possible to reduce the time to Detroit, Mich.; Cleveland, Ohio; Pittsburgh, Pa.; New York and other eastern points by about three hours as compared with the all-rail route through Chicago. The change from airplane to train at Grand Rapids is made in close proximity to the Michigan Central tracks. The Kohler company now provides three flights daily between Milwaukee and Grand Rapids in each direction, with extra service on Saturdays.



New Rail-Air Link Includes Train-Side Airport at Milwaukee

Traffic

The Northern Pacific, on July 2 and 3, handled a 15-car train containing 10 carloads of race horses from Winnipeg, Man., to Butte, Mont. In the train were 175 horses with owners, jockeys and stable attaches, who participated in the annual Fourth of July race meet at Butte.

The Chicago & Alton contemplates several improvements in its Chicago-St. Louis passenger service on July 20, including the establishment of a new train in each direction on a 7-hr. schedule and the placing of its Lincoln Limited and Prairie State Express in each direction on 6½-hr. schedules.

The St. Louis-San Francisco has taken over the operation of the dining cars, restaurants and news service which were formerly handled on this system by Fred Harvey, but will use the former Fred Harvey employees in all departments. It has also been arranged that Fred Harvey will continue to furnish all food supplies and merchandise that will be needed to conduct the operations.

The Interstate Commerce Commission has issued a report finding that the Montpelier & Wells River, the St. Johnsbury & Lake Champlain, the Tallulah Falls, the Chicago, Springfield & St. Louis and the Jacksonville & Havana are separately operated railroads less than 100 miles in length and so entitled to the rates of mail pay prescribed for roads so classified in its railway mail pay orders. It also denied a petition of the Postmaster General for a rehearing and revision of its order classifying the Springfield (Vt.) Terminal as a separately operated short line.

The Canadian National has added lounge cars with a miniature gymnasium, an ice cream parlor, baths, barber shop, valet service, and orthophonic and radio reception entertainment to The Confederation which operates between Toronto, Ont., and Vancouver, B. C. The new car, of which 12 will be used in this service, is 84 ft. 7½ in. long. The shower bath is located adjacent to the exercise room which contains vibratone and Swedish massage machines as well as foot and hand exercising apparatus. The lounge is fitted in English silver hardwood and has seating accommodation for 30 passengers. The window panes are made of vitra glass which permits the passage of ultra-violet rays of light.

The New York Central and the Pennsylvania have added single-room sleeping cars to their service between Chicago and New York, the cars being carried on the Twentieth Century Limited and the Broadway Limited. On July 13, the Pennsylvania added this type of car to the Golden Arrow which operates between Chicago and New

York and the Liberty Limited which operates between Chicago and Washington.

An individual passenger occupying one of these rooms pays one and one-quarter fares plus the cost of two lower berths; two persons pay two railroad fares and for two lower berths.

The open-platform observation cars originally used on the Sportsman, new Chesapeake & Ohio train between Michigan and Ohio cities and Virginia resorts, have been replaced within the past week by club-observation cars, in which a solarium, equipped with wide plate glass windows and eight wicker chairs, takes the place of the open platform. The cars, which are decorated in various shades of green, also contain a buffet, heavily upholstered sofas and chairs, writing desk, card and library tables and radio, while the forward end is occupied by three compartments and one drawing room.

St. Louis-Mexico City Time Reduced

The Missouri Pacific, in conjunction with the National Railways of Mexico, will place the southbound Sunshine Special on a 61-hr. schedule between St. Louis, Mo., and Mexico City, D. F., on July 20, thereby shortening the present schedule 9 hr. 45 min. This train will leave St. Louis at 6:30 p.m. as at present but will arrive in Mexico City at 7:30 a.m. instead of 5:20 p.m.

Perishable Refrigeration Being Studied

A special train of 13 cars of oranges and 5 cars of lemons left Holden, Cal., on July 10 for New York, 3,316 miles, in charge of four representatives of the U. S. Department of Agriculture who are making the test run for the purpose of studying the refrigeration methods of perishables in transit. The train, which arrived at New York on July 18, was handled by the Southern Pacific, the Chicago, Rock Island & Pacific and the Erie. During the trip the temperature of the cars was recorded by electric equipment located in a business car attached to the rear of the train. In addition a record of the amount of ice used was kept.

Air-Rail Service Sets New Record

The number of passengers using the 48-hr. coast-to-coast air-rail route operated by the Pennsylvania, the Atchison, Topeka & Santa Fe and the T. A. T.-Maddux air lines during June, the final month in the first year of the line's operation, broke all previous records in the history of the company. Passengers carried in June totaled 5,688, compared with 5,474 for May, 1930, the highest previous month. Plane-miles flown in June were also the largest in the company's history, the total of 246,525 representing a slight increase over the pre-

vious record of 245,129 plane-miles set in April of this year.

A slight increase in air fare, effective June 15, has caused no decrease in patronage, according to T. B. Clement, general traffic manager.

Figures for the first complete year of operation show that a total of approximately 30,000 passengers were carried and that plane-miles flown amounted to 1,250,000.

Fourth Section Relief Allowed on Lumber

The Interstate Commerce Commission has granted authority to the transcontinental carriers and their connecting lines to establish or continue rates on lumber and other forest products from south Pacific coast territory to points in central territory lower than those to intermediate points, subject to certain limitations, to enable circuitous lines to participate in the traffic to competitive points without breaking down or modifying certain established rate groups. The commission finds that the situation presented is a "special case" within the meaning of section 4; that the destination grouping in connection with the rates in issue is, so far as the record shows, compatible with the public interest and not in violation of sections 1 or 3; that the preservation of this grouping constitutes a sufficient reason for maintaining at intermediate points on the circuitous routes in question rates higher than at final destination, but not higher than the group rates now in effect; and that appropriate relief should be granted for the purpose of continuing such grouping subject to the conditions set forth in a prior report and order, except the equi-distant rule. For these reasons the finding in the prior report that the only ground presented for relief in this situation is the circuitry of the lines or routes seeking relief, is modified. Commissioners McManamy, Lee, Farrell and Tate dissented.

North Western Features Excursions

The Chicago & North Western has established a combination train and boat excursion between Chicago and Milwaukee, Wis., to stimulate rail travel. From June 29 to September 1, special round trip excursion tickets from Chicago to Milwaukee and from Milwaukee to Chicago, providing for a return trip by boat, are being sold. The special tickets are good going in both directions by rail and returning by the boats of the Goodrich Transit Company. These tickets are limited to return on the day of sale.

During the last week in June and the first week in July, this company established a peak in excursion business for the system for the year. During the final week in June, 36 special camp and vacation parties, totaling more than 2,900 persons, left Chicago. On June 30, 13 parties totaling 1,681 people left in special trains and special cars for

vacation camps in the Rocky mountains, the North Woods and nearby lakes. The largest single movement of this period occurred on June 30 when more than 300 boys left for Camp Roosevelt at Mercer, Wis., and 436 mothers and children left for a ten-day stay at Camp Reinberg, near Palatine, Ill. A third party of 125 boys and six counselors of the United Charities Union League boys club left on the same day for a ten-day vacation at Salem, Wis. In addition, nine special trains in addition to the regular trains were operated to Arlington Park, Ill., for horse-racing patrons. Seventeen excursions in and out of Chicago for the Fourth of July represented the largest movement of this kind this year and one of the largest excursion movements ever scheduled by this railroad. Minneapolis, St. Paul, Omaha, Duluth, Superior, Milwaukee and Chicago were among the larger cities from which rates were offered.

Fourth Section Relief for Pacific Coast Traffic

The Interstate Commerce Commission, after a reconsideration of previous reports and various applications of the carriers for fourth-section relief on traffic between San Francisco and other California terminals and Puget Sound and Columbia river ports, has issued a report authorizing the establishment or continuance of rates between those points lower than to intermediate points in order to compete with the steamship lines, subject to a series of conditions which include features of flexibility and the maintenance of certain differentials between the rail and the water rates. The commodity rates are to be no lower than to yield minimum carload revenue of 6 mills a ton-mile where the carload minimum weight is 40,000 pounds or over, and 12 cents a car-mile where the carload minimum weight is under 40,000 pounds. The rate on any class or commodity at any intermediate point shall not exceed the rate to or from the port by more than 100 per cent. The present rates at intermediate points shall not be increased except under certain conditions and shall in no case exceed the lowest combinations. The port-to-port carload commodity rates shall not be less than prescribed differentials over the rates of the standard steamer line publishing to lowest rate.

Applicants may change their terminal rates from time to time to bring them into line with any changes which may occur in the water rates, but in doing so they shall not violate any of the conditions prescribed, except that the minimum differentials as to any class or commodity as to which changes are made shall be applied to the lowest rates of the standard steamer lines.

Railway Traffic in May

The volume of freight traffic handled by the Class I railroads in May amounted to 36,576,433,000 net ton-miles, (Continued on page 132)

Operating Statistics of Large Steam Railways — Selected Items for May, 1930, Comp

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line			
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotives and tenders	Net. Revenue and non-revenue	Servicable	Un-servicable	Per cent unservicable	Stored
New England Region:												
Boston & Albany.....	1930	407	173,240	184,069	4,632	65.1	243,892	86,770	104	21	16.6	44
	1929	407	206,995	218,129	5,320	67.5	270,584	98,905	104	17	14.3	39
Boston & Maine.....	1930	2,066	366,480	421,342	13,069	70.0	673,122	258,537	240	50	17.3	60
	1929	2,059	404,878	474,726	14,956	71.5	689,926	267,969	258	40	13.4	48
N. Y., New H. & Hart.....	1930	2,104	454,919	527,841	15,729	63.1	870,956	330,641	274	66	19.3	39
	1929	2,104	521,561	596,137	17,079	67.7	889,034	347,126	277	74	21.0	16
Great Lakes Region:												
Delaware & Hudson.....	1930	875	325,461	432,576	10,885	63.1	667,443	312,981	238	30	11.2	91
	1929	875	345,010	458,956	11,311	66.4	679,281	317,537	241	28	10.5	81
Del., Lack. & Western.....	1930	998	468,386	515,014	16,089	66.5	910,925	369,113	238	55	18.9	38
	1929	998	547,753	610,275	19,442	66.8	1,104,623	462,471	240	59	19.6	6
Erie (inc. Chi. & Erie).....	1930	2,316	811,100	869,270	36,708	62.2	2,191,494	851,689	413	87	17.5	98
	1929	2,316	925,027	995,223	41,323	63.7	2,457,571	1,009,739	391	102	20.7	27
Grand Trunk Western.....	1930	1,020	306,092	308,944	3,200	8.899	498,444	184,625	94	35	27.3	21
	1929	992	387,049	389,005	1,788	11,075	640,731	236,962	119	25	17.1	...
Lehigh Valley.....	1930	1,343	515,507	559,486	16,321	64.8	984,939	425,590	267	76	22.1	23
	1929	1,343	562,711	616,776	18,704	64.2	1,122,645	486,844	289	87	23.1	52
Michigan Central.....	1930	1,865	476,443	477,925	13,250	16,398	942,734	313,298	167	53	24.1	38
	1929	1,822	606,026	609,658	17,356	22,080	1,204,089	408,077	192	39	16.9	17
New York Central.....	1930	6,468	1,911,631	2,092,142	140,788	74,565	4,554,202	1,896,570	1,038	325	23.8	356
	1929	6,467	2,111,061	2,348,975	163,115	85,126	5,121,025	2,122,803	973	354	26.7	153
New York, Chi. & St. L.....	1930	1,665	582,489	597,685	19,178	61.4	1,096,795	390,960	201	58	22.3	45
	1929	1,665	672,274	679,192	7,102	22,230	1,235,619	462,149	206	66	24.3	32
Pere Marquette.....	1930	2,177	408,347	411,313	4,083	10,514	621,044	249,311	166	27	13.8	31
	1929	2,178	466,942	471,200	5,428	12,034	714,697	303,257	177	35	16.3	7
Pitts. & Lake Erie.....	1930	231	119,960	121,931	1,369	4,605	360,702	206,346	51	14	22.1	19
	1929	231	138,480	140,931	1,566	5,057	384,880	218,530	52	12	18.2	12
Wabash.....	1930	2,497	751,947	795,566	10,976	23,517	1,345,120	465,993	295	78	21.0	54
	1929	2,497	875,119	908,449	13,772	26,249	1,507,576	552,408	290	71	19.7	17
Central Eastern Region:												
Baltimore & Ohio.....	1930	5,541	1,702,905	1,963,689	244,667	54,884	3,702,788	1,682,259	993	195	16.4	206
	1929	5,536	2,099,378	2,370,575	278,011	62,964	4,194,169	1,946,947	995	208	17.3	95
Big Four Lines.....	1930	2,712	767,602	797,021	18,447	23,379	1,503,532	666,188	312	144	31.5	31
	1929	2,717	822,081	854,144	23,776	27,026	1,726,997	773,337	354	133	27.3	45
Central of New Jersey.....	1930	692	272,320	296,353	48,088	7,937	539,897	246,037	165	31	15.6	15
	1929	691	277,232	299,245	51,160	8,172	546,595	248,780	178	30	14.4	25
Chicago & Eastern Ill.....	1930	946	217,803	218,167	2,869	6,193	346,327	149,453	99	51	33.9	38
	1929	946	237,445	238,334	2,531	6,826	395,069	168,991	88	77	46.6	22
Elgin, Joliet & Eastern.....	1930	453	127,568	136,143	5,791	3,647	279,819	142,143	74	14	16.4	2
	1929	453	146,289	155,332	6,367	4,326	324,399	168,988	76	12	13.2	3
Long Island.....	1930	400	46,293	50,975	11,649	565	39,835	15,475	41	5	11.2	1
	1929	400	51,483	57,403	16,561	640	43,318	16,893	56	8	11.9	...
Pennsylvania System.....	1930	10,788	3,690,583	4,229,870	419,343	133,400	8,904,888	4,009,344	2,427	299	11.0	654
	1929	10,738	4,244,401	4,858,907	459,281	152,140	10,227,413	4,746,003	2,667	249	8.5	596
Reading.....	1930	1,454	604,664	657,219	58,434	16,933	1,218,443	578,367	321	57	15.1	57
	1929	1,452	618,077	682,557	52,152	18,032	1,217,150	587,832	342	59	14.8	56
Pocahontas Region:												
Chesapeake & Ohio.....	1930	3,088	1,154,497	1,219,359	51,186	42,282	3,503,150	1,874,127	568	89	18.6	116
	1929	3,075	1,231,130	1,320,457	56,074	44,402	3,594,835	1,936,653	586	116	16.5	82
Norfolk & Western.....	1930	2,230	770,259	866,636	44,503	29,198	2,396,541	1,239,129	462	41	8.2	124
	1929	2,230	868,580	981,564	36,786	33,790	2,789,184	1,500,406	467	59	11.2	104
Southern Region:												
Atlantic Coast Line.....	1930	5,155	660,353	663,104	9,860	16,955	899,599	334,667	384	68	15.0	96
	1929	5,153	781,242	788,711	9,880	21,834	1,189,017	423,541	426	57	11.9	75
Central of Georgia.....	1930	1,900	258,937	259,894	4,130	6,062	334,127	132,154	123	29	18.8	6
	1929	1,900	288,476	290,875	4,120	7,047	376,380	154,013	136	17	11.0	14
Ill. Cent. (inc. Y. & M. V.).....	1930	6,695	1,779,969	1,793,415	28,419	46,989	3,056,412	1,182,367	704	128	15.4	49
	1929	6,710	2,027,850	2,041,042	31,928	54,894	3,517,903	1,396,053	744	108	12.7	22
Louisville & Nashville.....	1930	5,242	1,542,555	1,634,113	47,366	33,936	2,328,973	1,065,940	568	127	18.3	72
	1929	5,247	1,717,096	1,794,665	56,512	37,093	2,547,818	1,166,445	585	99	14.5	47
Seaboard Air Line.....	1930	4,479	565,474	591,011	5,777	14,386	819,901	294,665	274	30	9.9	8
	1929	4,475	628,120	659,011	8,554	16,616	965,594	330,536	265	43	14.0	...
Southern.....	1930	6,676	1,377,002	1,407,292	27,270	33,744	1,918,979	734,086	800	155	16.2	177
	1929	6,679	1,541,008	1,571,278	34,010	38,205	2,156,124	837,755	830	122	12.8	108
Northwestern Region:												
Chi. & North Western.....	1930	8,459	1,291,214	1,351,619	24,761	33,461	2,029,997	752,357	751	89	10.5	128
	1929	8,467	1,424,927	1,486,834	24,449	37,947	2,263,418	873,610	735	100	11.9	90
Chi., Milw., St. P. & Pac.....	1930	11,318	1,528,181	1,627,758	84,982	44,238	2,701,768	1,086,077	799	146	15.5	245
	1929	11,244	1,681,359	1,805,908	109,450	52,069	3,096,443	1,280,404	780	150	16.2	175
Chi., St. P., Minn. & Om.....	1930	1,724	283,681	306,263	13,060	6,082	344,161	136,780	151	21	12.4	44
	1929	1,724	302,373	324,676	14,850	6,602	362,874	146,704	149	23	13.4	26
Great Northern.....	1930	8,338	760,365	772,836	30,897	27,743	1,723,010	842,909	453	152	25.1	58
	1929	8,374	855,024	879,037	57,533	33,984	2,100,833	1,032,749	471	144	23.5	54
Minn., St. P. & S. St. M.....	1930	4,388	422,083	433,328	4,567	11,844	656,689	287,797	182	45	19.7	25
	1929	4,357	477,154	493,157	7,628	14,070	767,753	344,838	199	43	17.8	16
Northern Pacific.....	1930	6,468	588,117	727,044	44,591	23,025	1,245,007	566,149	409	116	22.1	59
	1929	6,476	812,045	862,141	50,486	28,142	1,590,221	705,104	423	118	21.9	46
Oreg.-Wash. R. R. & Nav.....	1930	2,245	176,778	184,491	10,055	4,978	274,567	117,283	116	20	14.9	39
	1929	2,246	199,925	208,178	12,868	5,883	329,745	141,805	120	10	7.3	30
Central Western Region:												
Atch., Top. & S. Fe (incl. P. & S. F.).....	1930	11,200	1,578,235	1,697,266	76,678	49,884	2,898,574	1,064,890	777	143	15.6	227
	1929	11,235	1,760,806	1,895,105	94,930	56,982	3,348,949	1,224,803	798	157	16.4	174
Chicago & Alton.....	1930	1,900	260,492	271,826	3,377	6,420	406,957	156,028	129	18	12.0	

ared with May, 1929, for Roads with Annual Operating Revenues above \$25,000,000.

Region, road and year	Average number of freight cars on line			Per cent un-serv-ice-able	Gross ton-miles per train-hour, ex-cluding loco-motives and tenders	Gross ton-miles per train-mile, ex-cluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Loco-motive-miles per locomotive-day
	Home	Foreign	Total										
New England Region:													
Boston & Albany.....1930	3,894	3,725	7,619	5.3	20,309	1,408	501	18.7	367	30.2	6,876	149	52.1
1929	3,221	5,385	8,606	9.1	18,631	1,307	478	18.6	371	29.6	7,837	160	63.1
Boston & Maine.....1930	11,171	10,953	22,124	4.6	22,590	1,837	705	19.8	377	27.2	4,036	101	53.1
1929	9,266	13,010	22,276	4.2	20,763	1,704	662	19.2	388	28.3	4,198	111	57.5
N. Y., New H. & Hart..1930	17,133	13,944	31,077	12.4	25,273	1,915	727	21.0	343	25.9	5,068	101	52.8
1929	15,293	16,742	32,035	8.5	22,202	1,705	666	20.3	350	25.4	5,323	108	58.5
Great Lakes Region:													
Delaware & Hudson....1930	9,909	5,082	14,991	4.6	26,693	2,051	962	28.8	673	37.1	11,535	120	57.6
1929	9,468	6,331	15,799	4.1	25,046	1,969	920	28.1	648	34.8	11,707	134	60.8
Del., Lack. & Western...1930	18,867	6,478	25,345	4.6	25,448	1,945	788	22.9	470	30.8	11,929	125	63.1
1929	16,974	8,876	25,850	4.5	25,582	2,017	844	23.8	577	36.3	14,946	130	73.4
Erie (inc. Chi. & Erie)..1930	34,874	15,821	50,695	4.2	37,182	2,702	1,050	23.2	542	37.5	11,863	102	60.3
1929	29,290	19,487	48,777	4.4	34,496	2,657	1,092	24.4	668	42.9	14,063	108	70.0
Grand Trunk Western...1930	3,894	10,402	14,296	6.5	24,288	1,628	603	20.7	417	30.8	5,841	92	78.0
1929	3,014	16,054	19,068	4.4	22,272	1,655	612	21.4	401	29.0	7,709	103	88.0
Lehigh Valley1930	19,834	7,658	27,492	10.5	28,566	1,911	826	26.1	499	29.5	10,224	137	58.0
1929	20,589	9,689	30,278	10.5	27,920	1,995	865	26.0	519	31.0	11,690	143	58.9
Michigan Central.....1930	23,575	13,750	37,325	5.3	34,782	1,979	658	19.1	271	23.7	5,418	102	72.2
1929	16,926	17,691	34,617	5.4	32,954	1,987	673	18.5	380	33.3	7,225	108	87.5
New York Central.....1930	74,731	66,775	141,506	4.6	33,283	2,382	992	25.4	432	27.8	9,459	95	52.9
1929	67,659	78,069	145,728	5.1	33,273	2,426	1,006	24.9	470	31.1	10,589	101	61.1
New York, Chi. & St. L..1930	15,071	8,772	23,843	8.1	28,956	1,883	671	42.3	529	42.3	7,576	96	75.5
1929	13,174	10,048	23,222	6.0	27,028	1,838	687	20.8	642	48.3	8,955	103	81.4
Pere Marquette1930	8,428	6,931	15,359	3.4	22,475	1,521	611	23.7	523	34.7	3,694	92	69.6
1929	10,196	9,158	19,354	3.4	20,344	1,531	649	25.2	505	32.1	4,492	100	72.7
Pitts. & Lake Erie.....1930	15,674	6,640	22,314	6.1	39,033	3,007	1,720	44.8	298	10.6	28,789	86	61.4
1929	12,059	9,947	22,006	7.3	32,958	2,779	1,578	43.2	320	11.8	30,481	100	72.0
Wabash1930	17,864	10,670	28,534	3.1	30,705	1,789	620	19.8	527	42.1	6,021	109	69.7
1929	14,949	13,184	28,133	2.3	28,921	1,723	631	21.0	633	47.4	7,138	119	82.5
Central Eastern Region:													
Baltimore & Ohio.....1930	78,186	24,756	102,942	5.2	26,090	2,174	988	30.7	527	28.3	9,794	132	60.0
1929	71,175	32,724	103,899	7.0	23,364	1,998	927	30.9	604	31.9	11,344	140	71.0
Big Four Lines1930	25,635	21,917	47,552	4.5	30,251	1,959	868	28.5	452	26.4	7,925	109	57.7
1929	22,650	22,839	45,489	4.9	29,258	2,101	941	28.6	548	31.4	9,180	109	58.1
Central of New Jersey...1930	17,112	9,859	26,971	5.4	25,255	1,983	903	31.0	294	16.7	11,465	138	56.7
1929	16,642	11,130	27,772	6.0	23,585	1,972	897	30.4	289	16.4	11,622	148	54.3
Chicago & Eastern Ill...1930	13,218	3,330	16,548	43.2	26,638	1,590	686	24.1	291	18.2	5,095	119	47.5
1929	13,069	3,960	17,029	39.5	24,897	1,664	712	24.8	320	19.6	5,761	122	47.2
Elgin, Joliet & Eastern..1930	9,695	7,075	16,770	4.3	16,375	2,193	1,114	39.0	273	11.1	10,126	119	52.0
1929	8,924	8,472	17,396	5.7	16,112	2,218	1,155	39.1	313	12.6	12,028	124	60.0
Long Island1930	778	4,503	5,281	1.3	6,234	860	334	27.4	95	6.5	1,247	314	43.6
1929	1,026	4,937	5,963	2.0	6,038	841	328	26.4	91	6.5	1,361	330	37.3
Pennsylvania System....1930	226,759	74,171	300,930	3.6	30,539	2,413	1,086	30.1	430	23.0	11,989	116	55.0
1929	215,525	88,766	304,291	5.1	28,958	2,410	1,118	31.2	503	25.7	14,257	119	58.8
Reading1930	32,020	11,327	43,347	5.2	23,062	2,015	957	34.2	430	21.6	12,832	132	61.0
1929	28,060	13,938	41,998	4.2	21,729	1,969	951	32.6	452	22.8	13,058	139	59.1
Pocahontas Region:													
Chesapeake & Ohio.....1930	42,492	11,477	53,969	2.2	40,447	3,034	1,623	44.3	1,120	45.7	19,578	79	62.4
1929	36,998	13,105	50,103	3.0	37,413	2,920	1,573	43.6	1,247	50.8	20,314	85	63.3
Norfolk & Western.....1930	34,204	7,296	41,500	0.9	43,017	3,111	1,609	42.4	963	39.2	17,925	112	58.4
1929	30,328	8,413	38,741	1.1	44,511	3,211	1,727	44.4	1,249	47.7	21,703	117	62.5
Southern Region:													
Atlantic Coast Line.....1930	25,091	7,719	32,810	5.0	20,933	1,362	507	19.7	329	25.5	2,094	104	48.0
1929	21,546	9,761	31,307	5.6	22,435	1,522	542	19.4	436	37.0	2,651	101	55.3
Central of Georgia.....1930	6,243	2,877	9,120	8.5	19,353	1,290	510	21.8	467	32.3	2,244	128	56.0
1929	3,675	5,103	8,778	7.0	18,924	1,305	534	21.9	566	37.0	2,615	133	62.2
Ill. Cent. (inc. Y. & M. V.)1930	47,975	17,442	65,417	5.0	25,989	1,717	664	25.2	583	38.3	5,697	125	70.6
1929	40,671	20,512	61,183	5.7	25,146	1,735	688	25.4	736	47.2	6,711	124	78.5
Louisville & Nashville...1930	47,444	11,903	59,347	8.5	21,788	1,510	691	31.4	579	31.8	6,560	133	78.0
1929	45,687	16,044	61,731	8.7	19,900	1,484	679	31.4	610	33.5	7,171	135	87.3
Seaboard Air Line.....1930	15,897	6,310	22,207	3.2	19,998	1,450	521	20.5	428	34.0	2,122	119	63.2
1929	14,857	8,979	23,836	5.6	19,981	1,537	526	19.9	447	37.4	2,383	125	69.9
Southern1930	53,737	14,616	68,353	11.8	20,820	1,394	533	21.8	346	25.3	3,547	143	48.5
1929	48,497	17,632	66,129	10.0	20,442	1,399	544	21.9	409	29.9	4,046	150	54.4
Northwestern Region:													
Chi. & North Western...1930	49,827	22,835	72,662	7.3	21,077	1,572	583	22.5	334	24.2	2,869	122	52.9
1929	46,874	26,656	73,530	7.1	20,667	1,588	613	23.0	383	26.7	3,328	124	58.4
Chi., Mil., St. P. & Pac.1930	57,102	16,933	74,035	3.1	23,805	1,768	711	24.6	473	31.4	3,096	121	58.4
1929	49,530	23,060	72,590	3.0	24,018	1,842	762	24.6	569	36.9	3,673	121	66.4
Chi., St. P., Minn. & Om..1930	2,454	8,781	11,235	6.5	16,416	1,213	482	22.5	393	26.7	2,560	116	60.0
1929	2,498	8,752	11,250	6.7	15,660	1,200	485	22.2	421	28.7	2,746	115	63.8
Great Northern1930	42,272	7,354	49,626	5.7	29,382	2,266	1,109	30.4	548	42.8	3,261	112	42.9
1929	39,682	9,897	49,579	6.0	30,216	2,457	1,208	30.4	672	33.5	3,978	113	49.1
Minn., St. P. & S. St. M..1930	19,861	4,253	24,114	3.1	20,130	1,556	682	24.3	391	24.1	2,116	96	62.2
1929	19,381	5,519	24,900	4.6	19,516	1,609	723	24.5	455	27.2	2,553	96	66.8
Northern Pacific.....1930	41,178	5,596	46,774	8.6	25,066	1,809	823	24.6	390	21.5	2,824	141	47.4
1929	36,885	6,532	43,417	9.5	25,302	1,958	868	25.1	524	30.6	3,512	138	54.4
Ore.-Wash. R.R. & Nav..1930	8,152	2,676	10,828	4.7	22,609	1,553	663	23.6	349	20.8	1,685	157	46.2
1929	7,964	3,668	11,632	6.1	22,635	1,649	709	24.1	393	23.5	2,037	157</	

Traffic News

(Continued from page 129)

according to reports compiled by the Bureau of Railway Economics. Compared with May, 1929, this was a reduction of 5,269,075,000 net ton-miles or 12.6 per cent, and it was a reduction of 2,686,673,000 net ton-miles, or 6.8 per cent, under May, 1928. In the Eastern District, the freight traffic handled in May was a reduction of 12.5 per cent compared with the same month in 1929, while the Southern district reported a reduction of 12.4 per cent. In the Western district, there was a reduction of 12.8 per cent.

The freight traffic in the first five months of 1930 amounted to 177,826,476,000 net ton-miles, a reduction of 19,917,516,000 net ton-miles or 10.1 per cent under that of the corresponding period in 1929 and a reduction of 8,820,008,000 net ton-miles, or 4.7 per cent, under that of the same period in 1928. Railroads in the Eastern district for the five months period reported a decrease of 9.7 per cent in freight traffic handled compared with the same period in 1929, while the Southern district reported a decrease of 10.4 per cent. The Western district reported a decrease of 10.6 per cent.

The railroads established in May a new record for any month in the speed with which freight trains were operated. The average was 13.9 miles per hour, which represents the average for all freight trains between terminals including yard and road delays, no matter from what cause. This was an increase of one-tenth of one mile above the best previous record of 13.8 miles, which was attained in March and April this year. It also was an increase of six-tenths of a mile above the average for May last year.

The average daily movement per freight car in May this year was 29.4 miles, compared with 32.9 miles for the same month last year and 31.1 miles in May, 1928.

The average load per car in May this year was 26.3 tons, including less than carload freight as well as carload freight. This was a decrease of three-tenths of one ton below the average for May, 1929, but the same average as that for May, 1928.

B. & O. Installs Truck Service in New York

The Baltimore & Ohio, on July 15, inaugurated a co-ordinated rail-motor truck service for the handling of freight on Manhattan Island, New York. The new service is limited to carload, unrestricted, non-perishable freight and operates between the B. & O. terminals on Staten Island and the places of business of its Manhattan patrons.

Unlike some of the other railroads serving Manhattan the B. & O. operates no inland stations. Thus, when the Interstate Commerce Commission per-

mitted the cancellation of "constructive" station tariffs, trucking services in connection with B. & O. traffic ceased. The present arrangement is felt to meet the suggestions of the commission with regard to what the latter considers proper trucking services on Manhattan.

Under the plan shipments are transferred at Staten Island from cars to trucks and moved through the station of the B. & O. at Pier 21, Manhattan, to the doorway of the receiver without unloading. The same service is available on outbound freight.

The option of receiving or shipping freight through this service is given with the understanding that the shipper or consignee bears the cost of loading and unloading the merchandise in addition to the trucking costs between the carrier's station at Pier 21, East River, and the shipper's or consignee's place of business. If immediate delivery of goods is not desired the consignee may order that they be deposited at the carrier's station, as heretofore, and call for them with his own trucks at his convenience.

Announcing the new service, officials of the B. & O. said: "In devising this plan for the receipt and delivery of freight, the report of the Interstate Commerce Commission in Docket 19715, subsequent to that body's investigation of former constructive trucking practices at New York, was given full cognizance in order that the regulations and practices of the service just established might conform thereto. In fact, shippers or receivers will bear that portion of the expense of all truck movements that would ordinarily be borne by them in shipping through present facilities, except that this expense is on a reasonable and proper basis and is not the result of any stated loading or unloading costs, such as those arbitrarily set at the usual pier station facilities, and which costs must be paid by shippers and receivers to organizations independent of the rail carriers.

"With the carload freight largely diverted from its Pier 21, East River station under the method of handling described and the contemplated diversion, within a short time, of l.c.l. from the pier stations through the proposed union inland stations, which are to be constructed by the Port of New York Authority in conjunction with all New York carriers, the alternate service will tend to dry up the traffic normally moving through pier station facilities and enable the carriers eventually to surrender these costly piers to the city for steamship operation, this, of course, assuming that both plans of receipt and delivery prove satisfactory to the shipping public. It is generally understood that there has been a constant demand by steamship lines for Manhattan pier locations."

Three New York trucking companies, E. A. Thompson, Inc., the Bell Trucking Company and the Seaman Trucking Company will handle the business jointly as the Store Door Trucking Corporation.

Foreign

French Roads Announce 1930 Construction Programs

Exclusive of proposed expenditures for rolling stock, provided for in the five-year schedule approved by the Superior French Railway Council in January, 1930, the various French railways plan to spend a total of approximately 1,153,212,000 francs (about \$44,975,300) on improvements and new construction during the current year, according to Department of Commerce reports.

The Northern will spend about 32,000,000 francs (\$1,248,000) on the completion of a large freight yard and station now being built at Le Bourget, and will also carry out a similar development at Mitry-Glaze and extension of local trackage at Dunkirk. Most of the expenditure of 200,000,000 francs (\$7,800,000) proposed by the Eastern system will be devoted to improvements in the vicinity of Paris and particularly to the enlargement, to three times its former size, of the company's Paris passenger terminal. The Paris, Lyons & Mediterranean will spend about 12,000,000 francs in electrifying its line between Culoz and Modan, but the largest single item in its budget is the quadrupling of its tracks between Paris and Dijon. Both the Paris-Orleans and the Southern have assigned about half of their respective capital appropriations for the year to continuation and further development of electrification, with minor improvements to stations and lines at various points absorbing the rest. The State railway will spend 236,000,000 francs, plus 46,000,000 francs to be received from Germany on reparations account, a total of 282,000,000 francs (about \$10,998,000) on general improvements. This sum includes 66,000,000 francs for station improvements; 53,000,000 for general improvements; 13,000,000 for three grade crossing eliminations, and 12,000,000 for further electrification of suburban lines near Paris. The Alsace-Lorraine system has appropriated 10,800,000 francs for improvement of stations at Mulhouse and Forbach.

CAR IMPACT PLANT.—The Waugh-Gould car impact plant, designed and built with the idea of duplicating, so far as possible, actual service conditions for draft-gear tests, provides the subject for discussion in an attractive booklet issued by the Waugh Equipment Company, Depew, N. Y. The method of conducting a test with two 70-ton all-steel hopper cars, some of the instruments used, and the action of cars during impact are described and illustrated, and the procedure for car impact tests of friction gears outlined. The facilities at this plant are available to railroad officers who are interested in determining, under their own supervision and test methods, the exact characteristics of Waugh-Gould draft gears.

Equipment and Supplies

Locomotives

THE LEHIGH & NEW ENGLAND is inquiring for three heavy switching locomotives and two freight locomotives of the 2-10-0 type.

Freight Cars

THE LEHIGH & NEW ENGLAND is inquiring for 300 steel box cars of 50 tons' capacity and five steel caboose cars.

THE NATIONAL DUMP CAR COMPANY has ordered ten steel rock cars of 50 tons' capacity from the American Car & Foundry Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 25 all-steel drop-end gondola cars, with steel floors, of 70 tons' capacity and 65 ft. long, from the Magor Car Corporation.

THE MINNEAPOLIS & ST. LOUIS has ordered 500 box cars from the General American Car Company. Inquiry for this equipment was reported in the *Railway Age* of April 12.

THE ALUMINUM COMPANY OF AMERICA has ordered 20 special hopper cars and 25 hopper cars of 70 tons' capacity from the Canton Car Company. Inquiries for this equipment were reported in the *Railway Age* of April 19 and June 21.

Passenger Cars

CHICAGO & NORTH WESTERN. — See Union Pacific.

THE ARMS-YAGER CAR COMPANY is inquiring for 15 stallless horse cars 50 ft. long.

THE UNION PACIFIC has ordered 14 chair cars, four of which will be used on the Chicago & North Western, from the Pullman Car & Manufacturing Corporation, and 10 baggage cars and one baggage and mail car from the Pressed Steel Car Company. Inquiry for this equipment was reported in the *Railway Age* of June 7.

Machinery and Tools

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered a 54-in. tire turning lathe from Manning, Maxwell & Moore, Inc.

THE NORTHERN PACIFIC has ordered two heavy double axle lathes from Manning, Maxwell & Moore, Inc.

THE UNION PACIFIC has ordered a 90-in.

journal turning machine from Manning, Maxwell & Moore, Inc.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC has ordered a car axle burnishing lathe from Manning, Maxwell & Moore, Inc.

THE CHESAPEAKE & OHIO has given a contract to the Industrial Brownhoist Corporation, Cleveland, Ohio, for the necessary machinery for its new coal pier now under construction at Newport News, Va. This machinery is similar to the coal dumping machinery used on the Great Lakes and will be capable of dumping fifty 120-ton coal cars an hour. The contract for the construction of the pier itself was awarded about six weeks ago to the W. Horace Williams Company, New Orleans, La., as reported in the *Railway Age* of June 7.

Iron and Steel

THE ERIE has received bids on 515 tons of steel for a highway bridge at Jersey City, N. J.

THE SOUTHERN RAILWAY has taken bids on 220 tons of steel for a bridge at Danville, Ky.

THE VIRGINIAN has received bids on 2,000 tons of steel for a bridge at Deep Water, W. Va.

THE BOSTON & MAINE has ordered 130 tons of steel for five bridges from the Boston Bridge Works.

THE PENNSYLVANIA has ordered 320 tons of steel from the McClintic-Marshall Company for bridges at Mountville, Pa., and Philadelphia.

Signaling

THE PENNSYLVANIA has ordered from the Union Switch & Signal Company materials for an electro-pneumatic interlocking at Ozone Park, L. I., covering a 27-lever Model 14 interlocking machine, style A-1 electro-pneumatic switch movements, position light signals, etc.

THE MONONGAHELA CONNECTING has ordered from the Union Switch & Signal Company materials for a mechanical interlocking plant to be installed at Second avenue, Pittsburgh, Pa. The layout calls for a 16 lever Saxby & Farmer interlocking machine operating seven switches, four crossovers and four double slip switches.

THE CHESAPEAKE & OHIO has placed an order with the Union Switch & Signal Company covering materials for a mechanical interlocking plant to be installed at MD Cabin, Meadow Creek, W. Va., involving an improved Saxby & Farmer machine having 20 levers. This company has also ordered from the Union Switch & Signal Company a ten-lever style S-8 electro-mechanical interlocking machine for installation at WS Cabin, White Sulphur, W. Va.

Supply Trade

The Rawlplug Company, Inc., has moved its office to 92-98 Lafayette street, New York City.

The Klasing Car Brake Company has moved its office to the Southmoor Hotel, 6646 Stony Island avenue, Chicago.

H. D. Carlton has resigned as president of the Consolidated Ashcroft Hancock Company, and as vice-president of Manning, Maxwell & Moore, Inc.

The Chase Brass & Copper Company, Inc., Waterbury, Conn., has opened a new warehouse at 855 North Avenue West, Pittsburgh, Pa.; heretofore the company has only had a sales office in Pittsburgh.

J. C. Baxter, vice-president of A. Guthrie & Company, St. Paul, Minn., at New York, has resigned to become connected with Carey & Kennedy, New York. The name of the latter contracting firm has been changed to Carey, Baxter & Kennedy.

Fairmount Railway Motors, Inc., will soon begin a \$200,000 building program which will include the completion of the construction of a new factory at Fairmont, Minn., by November 1. This company also plans to construct a new office building at this point.

H. H. Peasance, formerly general sales manager of the steel bar division of the Bourne-Fuller Company, Cleveland, Ohio, has been appointed district sales manager of the Republic Steel Corporation, Youngstown, Ohio, with headquarters at Indianapolis, Ind.

R. L. Hermann, transportation manager of the Southwestern district of the Westinghouse Electric & Manufacturing Company has been appointed heavy-traction representative with headquarters at New York. Mr. Hermann has been continuously identified with the Westinghouse Company since his graduation from the University of Illinois in 1915 with the exception of three years of service in the army.

Stuart R. Ives, vice-president and general manager of the Lyle Culvert & Pipe Company, Minneapolis, Minn., has been appointed general manager of the Armco Culvert Manufacturers Association, with headquarters at Middletown, Ohio. Previous to joining the staff of the Lyle Culvert & Pipe Company early in 1929, Mr. Ives was connected with the American Rolling Mill Company for 13 years of which ten years were spent in the culvert and flume department and seven years as manager of that department.

William A. Simonton will retire as director of the traffic department of the E. I. du Pont de Nemours & Company,

Inc., Wilmington, Del., on August 1 and will be succeeded by **Thomas B. Baker**; **F. S. Farrow** has been appointed traffic manager of the company to succeed Mr. Baker. Mr. Simonton was first employed in 1904 as a clerk in the sales-traffic department and was promoted until he became director. Mr. Baker has been with the du Pont Company since 1925; at that time he was employed by the traffic department, doing field work and later was in charge of the steamship division. Mr. Farrow entered the traffic department of the company in 1910 and was successively promoted until he became assistant traffic manager.

John F. Raps, who has been appointed central manager of the **Okadee Company** and the **Viloco Railway Equipment Company**, with headquarters at Chicago, entered railroad service as a special apprentice in June, 1900, with the Burlington, Cedar Rapids & Northern (now a part of the Chicago, Rock Island & Pacific). In July, 1904, he resigned to accept a position with the Toledo, St. Louis & Western at Frankfort, Ind., and in April, 1905, he entered the employ of the Illinois Central at Waterloo, Iowa. In April, 1909, he was promoted to general locomotive inspector, with headquarters at Chicago, which position



John F. Raps

he has held until he resigned to become central manager of the Okadee Company and the Viloco Railway Equipment Company.

N. G. Symonds, who has been appointed commercial vice-president at Chicago for the **Westinghouse Electric & Manufacturing Co.**, East Pittsburgh, Pa., has been connected with the Westinghouse organization at Chicago for 25 years. He was born at Ossining, N. Y., on September 19, 1878, and attended the Los Gatos (Cal.) high school, graduating from a course in electrical engineering at Leland Stanford University in 1901. His first engineering experience was with the Texas Consolidated Gold Mining Company and in 1902 he became connected with Westinghouse Church Kerr & Company. In 1903 Mr.

Symonds was appointed district superintendent of stoker erection and when the Westinghouse Machine Company became engaged in the manufacture of stokers he was assigned to East Pittsburgh. He was appointed a stoker salesman at Chicago in 1905 and in 1915



N. G. Symonds

when that company was absorbed by the Westinghouse Electric & Manufacturing Co., he was appointed manager of the power division at Chicago. Three years later he became manager of the industrial division and since 1921 he has been Chicago district manager.

Obituary

John M. Callen, for a number of years vice-president and a director of the Reading Iron Company and the Thomas Iron Company, Reading, Pa., died on July 2 at the Reading hospital following an operation for appendicitis. Mr. Callen was 73 at the time of his death. In his early business career he was employed by the Pottsville Iron & Steel Company. In July, 1899, he went to the Reading Iron Company where he served successively as auditor, purchasing agent, assistant general manager and vice-president having for several years had supervision of purchases, distribution of materials as well as contractual relations.

Trade Publication

SCIENTIFIC WATER CORRECTION.—Scale formation, corrosion and foaming in steam boilers, their causes and methods of prevention are reviewed concisely in a cloth-bound book of 95 pages just issued by the Dearborn Chemical Company, Chicago. The treatment is built around the water-treatment processes and service of this company, with particular reference to the new laboratory which is depicted in a number of photographs. Space is also devoted to the subject of embrittlement and to the various products of the Dearborn Company. The presentation is attractive and is supplemented by reproductions of photographs, charts, etc.

Construction

ATCHISON, TOPEKA & SANTA FE.—This company has presented a plan to the Board of City Directors of Pasadena, Cal., for the elimination of grade crossings in that city. The project, which would be paid for by both the railroad and the city, would involve a total expenditure of about \$6,930,000. It would involve elimination of about 40 street crossings, double-tracking of the Santa Fe line through the city, construction of a new passenger station in the central part of the city and another at Lamanda Park and a new freight station. From the south limits of Pasadena to California street it is planned to elevate the tracks and from the latter point the tracks would be depressed in an open cut through the business district to Hill avenue. At Hill avenue the tracks will be carried on an elevation to Eaton Canyon wash near the eastern limits of Pasadena.

BALTIMORE & OHIO.—This company has applied for a federal permit to build a river and rail terminal near Pittsburgh, Pa., on the right bank of the Monongahela river, about 6.7 miles above the river's mouth. The proposed terminal, which includes a loading pier, mooring pile clusters and ice breakers, will occupy a narrow strip of land, about 3,800 ft. long, running between the railroad tracks and the river, and will be able to handle 50 loaded and 50 empty cars at one time. River steamers will be accommodated in a harbor to be formed by dredging approximately 25,000 cu. yd. of material. The B. & O. project is intended primarily for the handling of coal shipments and has no relation to the proposed municipal river-rail terminal to be located diagonally across the river, which is designed for the transshipment of bulky general commodities and manufactured steel products.

CHESAPEAKE & OHIO.—A contract for a new single-track tunnel, to parallel the present single-track Lewis tunnel about 15 miles west of Covington, Va., has been awarded by this company to the Bates & Rogers Construction Company, Chicago. The location of the new tunnel, which is to cost approximately \$1,100,000, is between Alleghany, Va., and Jerrys Run. Its construction, together with its approaches, will provide a double track between Jerrys Run and East Alleghany, a distance of about one mile, which at the present time is single track. The tunnel, to be 3,168 ft. long, will be lined with concrete and the track will be laid on ballast supported by concrete floor slabs and headers. This is the third tunnel contract recently let by the C. & O.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has applied to the Interstate Commerce Commission for authority to construct an extension of 4.7 miles at Dallas, Tex.

DELAWARE, LACKAWANNA & WESTERN.—In connection with the electrification of its suburban lines in northern New Jersey, this company has awarded to Deakman-Wells, Jersey City, N. J., a contract for the construction of a concrete, brick and steel building to be used as a tie station at Dover, N. J.

GREAT NORTHERN-WESTERN PACIFIC.—It is expected that these companies will ask for bids for the construction of their joint line between Klamath Falls, Ore., and Paxton, Cal., 200 miles, about July 26. Representatives of 15 contractors started on a five-day horseback tour of the Western Pacific route from Paxton to Bieber, 112 miles, on July 10.

HOUSTON & TEXAS CENTRAL.—This company has applied to the Interstate Commerce Commission for authority to construct an extension of 5 miles in Harris county, Tex.

LONG ISLAND.—Plans submitted by this company for the elimination of its Deer Park avenue and Half Hollow grade crossings at Deer Park station, Babylon, N. Y., have been approved by the Public Service Commission of New York.

MONESSEN SOUTHWESTERN.—This company, a subsidiary of the Pittsburgh Steel Company, plans the construction, at a cost of approximately \$1,000,000, of an extension from Monessen, Pa., to Bellevue. Although meant primarily for inter-plant communication between the Monessen and Allenport mills of the Pittsburgh Steel Company, the new line will also furnish an exchange branch for the Pennsylvania, the Pittsburgh & Lake Erie and the Pittsburgh & West Virginia. The new branch of the Monessen Southwestern will be carried across the Monongahela river at Bellevue by the Pittsburgh & West Virginia.

NATIONAL OF MEXICO.—A plan has been proposed by the Mexican secretary of communications and public works, the chief of the department of the federal district and General Calles, chairman of the reorganization committee of the National Railways, to construct a new central passenger station to serve all railroads entering Mexico, D. F. At the present time the National Railways use the Colonia, the Buenavista, the San Lazaro and the Peralvillo stations and it is estimated that the cost of a new station, about \$9,600,000, could be met by the sale of the property on which three of the present stations are located.

NEW YORK CENTRAL.—In the course of hearings held before the Public Service Commission of New York on the methods to be used in eliminating the Storm King and Breakneck crossings of this company's tracks in Fishkill, N. Y., and Philipstown, the railroad company has proposed that the existing highway be carried through a tunnel to be built on the east side of the tracks. The cost of eliminating the crossings in this manner is estimated to be about \$40,000 less than that of carrying out the eliminations

by the construction of two overhead highway bridges, as ordered by the commission.

NEW YORK CENTRAL.—The Public Service Commission of New York has approved the general plan submitted by this company for the elimination of its Nichols avenue grade crossing, Syracuse, N. Y., by the extension of Midler avenue. The elimination of the Nichols avenue crossing is one of the projects in connection with the general program of grade crossing elimination in the city of Syracuse, reported in the *Railway Age* of November 16, 1929. The Public Service Commission has also approved the plan drawn up by the New York Central for the elimination of the Ballentine road grade crossing in Forestport, N. Y.

OCONEE & DEEPSTEP.—This company, of which E. J. Grassman, Elizabeth, N. J., is president, has applied to the Interstate Commerce Commission for authority to construct a line from Oconee to Campbell, Ga., 9 miles.

QUINCY, OMAHA & KANSAS CITY.—This company and the Missouri State Highway Commission plan the construction of grade separation structures at two points in Lewis county, Mo., where the railroad intersects State Highway No. 6, at a total cost of about \$40,000.

THE FIRST GAS-RAIL CAR TRAIN ever to be operated between the Atlantic and Pacific Oceans was put into commission recently by the International Railways of Central America and hereafter will be recognized as part of the road's standard equipment. The train was built by the J. G. Brill Company, Philadelphia, Pa., after a careful study of the requirements of the International system, including, among other difficult items of railroad engineering, a 17-mile continuous 2.4 per cent grade reaching an altitude of 3,000 feet. It is expected that this motor equipment will operate as a boat train between Puerto Barrios, Guatemala, and San Salvador, Salvador, over the new route inaugurated early this year, as reported in the *Railway Age* of January 18, page 216.

The train consists of a motor car weighing 39,925 lbs. carrying a pay-load of 6,900 pounds in the passenger compartment and 3,000 pounds in the baggage compartment. The passenger compartment will hold 37 second-class passengers. A trailer, weighing 27,460 lbs., will accommodate 22 first-class passengers.

The motor car is powered with a 6-cylinder four cycle, valve-in-head heavy-duty engine, rated at 175 H.P. at 1,300 R.P.M. It is located at the forward end and is removable as a unit. The drive is from the engine to a four-speed transmission suspended from the car body and located above the front or idler axle of the drive truck. While this car is geared to a maximum speed of 33.2 miles per hour it can be geared to make a speed of 45 miles per hour on a level track or 15 miles per hour over a continuous 5 per cent grade.

Financial

BOSTON & MAINE.—*Control of Springfield Terminal.*—The Interstate Commerce Commission has authorized this company to acquire control of the Springfield Terminal, which operates a line extending from Charlestown, N. H., to Bellows Falls and Springfield, Vt., approximately 13.5 miles, by purchase of its capital stock.

BOSTON TERMINAL COMPANY.—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,163,329 of first mortgage 20-year 4 per cent gold bonds, which it proposes to sell to Lee, Higginson & Co., and the First National-Old Colony Corporation, the highest bidders, at 99.09 and interest.

BUFFALO, ROCHESTER & PITTSBURGH.—*Final Valuation.*—The Interstate Commerce Commission, in a final valuation report as of June 30, 1917, finds the final value for rate-making purposes of the property owned and used for common-carrier purposes to be \$51,075,000, while that of the property used but not owned is placed at \$9,660,664. The books record an investment of \$52,912,192 in road and equipment, including land. If certain adjustments were made as required by the accounting examinations, the report says, this would be increased to \$54,474,099.

CANADIAN PACIFIC.—*Bonds.*—A syndicate including the National City Company and six other American and Canadian bankers is offering \$25,000,000 of 4½ per cent collateral trust bonds of this company, to mature in 1960, at 98, to yield 4.62 per cent.

CINCINNATI UNION TERMINAL COMPANY.—*Bonds and Notes.*—In an application filed with the Interstate Commerce Commission this company asks authority to issue \$38,000,000 of first mortgage gold bonds, to be sold from time to time at prices varying with market conditions, and particularly to issue and sell \$12,000,000 of 4½ per cent bonds at not less than 95 and interest. It has been negotiating with J. P. Morgan & Co., and Kuhn, Loeb & Co., and expects to sell the bonds at not less than 96 and interest. The proceeds are to be used in the completion of the union passenger station at Cincinnati. Pending the sale of the bonds the company also asks authority to issue \$15,000,000 of short term notes, to be sold at par either to the proprietary railroad companies or to banks.

GREAT NORTHERN PACIFIC.—*Further Hearing in Unification Case Asked.*—The Board of Railroad Commissioners of the State of North Dakota has filed with the Interstate Commerce Commission a petition for a further hearing and argument in the case involving the proposed acquisition by this company of control of the Great Northern and the Northern Pacific.

GEORGIA & FLORIDA.—Receivers' Certificates.—The Interstate Commerce Commission has authorized the receivers of this company to issue \$100,000 of their series A receivers' certificates in addition to \$500,000 of such certificates heretofore authorized, the issue to be sold at not less than 95.

GLENDALE & MONTROSE.—Abandonment.—This company has applied to the Interstate Commerce Commission for authority to abandon its line of 5.38 miles at Glendale, Cal.

GULF, MOBILE & NORTHERN.—Bonds.—The Interstate Commerce Commission has authorized this company to issue \$3,000,000 of first mortgage, series C, 5 per cent bonds, maturing in 1950, these bonds being authorized for sale to Kuhn, Loeb & Co. at 97, making the average annual cost to the railroad approximately 5.24 per cent.

PITTSBURGH & WEST VIRGINIA.—Price Paid by Pennroad Corporation.—C. F. Taplin, general counsel of the P. & W. V., has advised Director Mahaffie of the Bureau of Finance of the Interstate Commerce Commission that the price paid by the Pennroad Corporation last fall for 222,930 shares of P. & W. V. stock purchased from F. E. Taplin and associates was \$170 a share. The information was given in response to a commission ruling on motion of the Wheeling & Lake Erie and the New York, Chicago & St. Louis, during the hearing on the P. & W. V. application for authority to acquire control of the Wheeling.

READING.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$15,000,000 of general and refunding mortgage 4½ per cent bonds, to reimburse its treasury, to be sold at 97½ and interest to the First National Bank of New York.

SMOKY MOUNTAIN.—Excess Income.—The Interstate Commerce Commission has made public a tentative report of findings as to the value and excess income of this company for the period from May 1, 1920, to April 14, 1927, when the road was abandoned. No recapturable excess income is found for any of the earlier years but for the period in 1927 before the road ceased operations the net income above 6 per cent on the valuation is placed at \$3,097 and the company is ordered to pay \$1,548, as half of that amount, to the commission for the general railway contingent fund.

Average Prices of Stocks and of Bonds

	Last July 15	Last week	Last year
Average price of 20 representative railway stocks.	118.08	111.53	115.61
Average price of 20 representative railway bonds.	94.27	94.09	90.14

Dividends Declared

Missouri-Kansas-Texas.—Common, \$1.00, payable September 30 to holders of record September 5.
New Orleans, Texas & Mexico.—\$1.75, quarterly, payable September 2 to holders of record August 15.

Railway Officers

Executive

Charles D. Emmons, who recently resigned as president of the United Railways & Electric Company of Baltimore, Md., has been appointed president of the Hudson & Manhattan, effective September 1, succeeding **Oren J. Root**, resigned. Mr. Emmons' headquarters will be located at New York.

J. E. Taussig, president of the Wabash, with headquarters at St. Louis, has also been elected president of the New Jersey, Indiana & Illinois, succeeding **T. A. Hynes**, who has been elected vice-president and general manager, with headquarters as before at South Bend, Ind. **W. C. Maxwell**, vice-president in charge of traffic of the Wabash, with headquarters at St. Louis, Mo., has also been elected vice-president, traffic, of the Ann Arbor. **A. K. Atkinson**, assistant to the vice-president, accounting and treasury of the Wabash and the Ann Arbor, with headquarters at St. Louis, has been elected vice-president, secretary and treasurer of those roads and secretary and treasurer of the New Jersey, Indiana & Illinois, with headquarters at New York. **W. D. Steele** has been appointed assistant secretary and assistant treasurer of the Wabash at New York.

A. K. Atkinson, assistant to the vice-president of the Wabash, with headquarters at St. Louis, Mo., who has been appointed vice-president, secretary and treasurer of the Wabash and Ann Arbor, and also secretary and treasurer of subsidiary lines, with headquarters at



A. K. Atkinson

New York was born on October 19, 1891, at Denver Colo., and was educated in public schools and the School of Commerce and Accounts at Denver. He entered railway service in October, 1909, with the Denver & Rio Grande, (now D. & R. G. W.) as office boy in the office of the general auditor. He sub-

sequently held various clerical positions in the offices of the auditor of disbursements and general auditor, traveling accountant and special accountant until 1919. During the period of Federal control, and until 1922, he served successively as field accountant, supervising accountant and assistant comptroller. In 1922 he entered the service of the Wabash as assistant auditor and held that position until 1924 when he was promoted to assistant comptroller. He was appointed assistant to vice-president, the position he held until his recent appointment, in 1925.

Financial, Legal and Accounting

G. E. Bramon, general auditor of the Wabash, with headquarters at St. Louis, Mo., has also been appointed auditor of the New Jersey, Indiana & Illinois. **G. E. Francisco**, local treasurer of the Wabash at St. Louis, has also been appointed assistant treasurer of the N. J., I. & I.

H. C. Oswald, assistant secretary of the Canadian Pacific, with headquarters at Montreal, Que., has also been appointed secretary of the Algoma Eastern. **F. G. Millen**, assistant treasurer of the C. P. R. at Montreal, has also been appointed treasurer of the Algoma Eastern. **M. C. Barber** has been appointed general accountant of the Algoma Eastern, with headquarters at Sudbury, Ont.

The headquarters of **William Wyer**, secretary and treasurer of the Missouri Pacific Lines, **O. B. Huntsman** (vice-president) and **Edwin G. Wagner**, assistant secretaries and assistant treasurers, and **C. W. Veitch**, secretary and treasurer of the Texas & Pacific, and **A. C. Simmonds, Jr.**, assistant secretary and assistant treasurer of the latter road, have been removed from New York to Cleveland, Ohio.

Frank V. Whiting, general claims attorney of the New York Central, with headquarters at New York, has also been appointed general claims attorney of the Cleveland Union Terminals. **Oliver G. Browne** has been appointed assistant claims attorney, with headquarters at New York. **Frank A. Hruska**, chief claim agent of the Pittsburgh & Lake Erie, with headquarters at Cleveland, has also been appointed chief claim agent of the Cleveland Union Terminals.

Operating

E. E. Carter, assistant superintendent on the St. Louis-San Francisco at Neodesha, Kan., has been appointed acting superintendent of the Northern division,

with headquarters at Fort Scott, Kan., succeeding **W. H. Bevans**, who was granted a leave of absence on July 12.

J. A. Kennedy, paymaster for the Canadian Pacific at Winnipeg, Man., has been appointed superintendent of the Esquimalt & Nanaimo, with headquarters at Victoria, B. C., succeeding **John D. Fraser**, who has retired from active service.

Edward H. Friberg, assistant to the general superintendent of the Northern Pacific at Seattle, Wash., has been appointed assistant superintendent at Tacoma, Wash., succeeding **J. S. Dean**, deceased. The position of assistant to the general superintendent at Seattle has been abolished.

L. A. Podesta, superintendent of the Chicago Junction and the Chicago River & Indiana, with headquarters at Union Stock Yards, Chicago, has been appointed general superintendent of the Indiana Harbor Belt, with headquarters at Gibson, Ind., succeeding **F. G. Swafford**, who has been appointed general superintendent of the Chicago Junction and the Chicago River & Indiana, with headquarters at U. S. Yards, Chicago. **J. J. Kinsella**, assistant superintendent of the C. J. and the C. R. & I., has been promoted to superintendent of those roads, succeeding Mr. Podesta, and the position of assistant superintendent has been abolished.

R. J. Beilsmith, who has been promoted to superintendent of telegraph of the Wabash, with headquarters at Decatur, Ill., has been in the service of that railway for nearly 17 years. He began his telegraph experience as a line-man at Assumption, Ill. Later he was connected with the Macon County (Ill.) Telephone Company and the Automatic Company at Decatur. On September 1,



R. J. Beilsmith

1913, Mr. Beilsmith entered the service of the Wabash in charge of the telegraph district between Taylorville, Ill., and St. Louis, Mo. Seven years later he was advanced to supervisor of telegraph equipment, being promoted to

assistant superintendent of telegraph of the Wabash on January 1, 1928. Mr. Beilsmith has also been superintendent of telegraph of the Ann Arbor since January 1, 1930. His promotion to superintendent of telegraph of the Wabash became effective on July 1.

Charles W. Watts, who has been promoted to superintendent of the Northwestern district of the Missouri-Kansas-Texas, with headquarters at Wichita Falls, Tex., has been connected with that road for 28 years. He was born at Auxvasse, Mo., on June 10, 1887, and after attending public schools at Moberly, Mo., and Fayette, entered railway service at the age of 15 years as a clerk on the Katy. From 1902 to 1909 Mr. Watts served in various clerical



Charles W. Watts

positions in the local freight offices of the Katy at Fayette, Mo., Hannibal and Sedalia, in the yard office at Franklin, Mo., and in the superintendent's office at the same point. He then became freight and ticket agent at Fayette, serving from 1914 to 1918 as a traveling accountant and freight claim agent. After a short period as a district agent he was advanced to trainmaster on the Cherokee division at Muskogee, Okla., and in 1920 he was appointed division freight agent at Oklahoma City, Okla. In 1921, Mr. Watts was appointed transportation inspector, becoming superintendent of freight claim prevention in the operating department of the Katy Lines at Denison, Tex., in 1923. His promotion to superintendent of the Northwestern district became effective on July 1.

Traffic

Joe Campbell has been appointed Pacific Coast agent for the Quanah, Acme & Pacific at San Francisco, Cal.

W. H. Harlow, traveling freight and passenger agent of the Atchison, Topeka & Santa Fe at Mexico, D. F., has been promoted to general agent at that point.

Arthur L. Scott, city passenger agent for the Great Northern at Seattle,

Wash., has been promoted to general agent of the passenger department at San Francisco, Cal.

J. F. Scheer, assistant general passenger agent on the Baltimore & Ohio at Indianapolis, Ind., has been transferred to St. Louis, Mo., succeeding **J. G. Vannorsdall**, who has been transferred to Indianapolis.

John F. Bon, general freight agent of the Western Pacific, has been promoted to assistant freight traffic manager, with headquarters as before at San Francisco, Cal., succeeding **R. D. Williams**, who resigned on June 30. A sketch of Mr. Bon's railway career, together with a reproduction of his photograph, appeared in the *Railway Age*, November 16, 1929, page 1175, at the time of his promotion to general freight agent.

C. S. Roberts has been appointed assistant freight traffic manager of the Baltimore & Ohio, and will be succeeded as general freight agent by **H. G. Settle**, assistant to freight traffic manager. **R. J. Beggs**, assistant general freight agent, has been appointed assistant to freight traffic manager, succeeding Mr. Settle. These officers will all have headquarters at Baltimore, Md.

Engineering, Maintenance of Way and Signaling

Aless J. Loom, who has been promoted to general superintendent of timber preservation of the Northern Pacific, with headquarters at Brainerd, Minn., was born at Motley, Minn., on April 23, 1887. He completed his public school work at Motley in 1904 and for the following two years attended a business college at Minneapolis, Minn. Mr. Loom entered railway service in April, 1906, as a yard clerk on the Northern Pacific at Brainerd and in the following year he was advanced to chief yard clerk. In 1908 he was transferred to the engineering department as a timekeeper and yard clerk in the tie treating plant at Brainerd. Four years later he was promoted to yard foreman of the plant, becoming assistant superintendent of timber preservation and tie treating plants, with headquarters at Paradise, Mont., in 1919. Mr. Loom was promoted to general superintendent of timber preservation on July 1.

Andrew Gibson, who retired on July 1 as superintendent of timber-preservation and tie-treating plants of the Northern Pacific, with headquarters at Brainerd, Minn., has been connected with that road for 47 years. He was born in Ross-shire, Scotland, on June 16, 1860, and attended the Tain Royal Academy in that country until 1879. Mr. Gibson entered railway service in 1883 as a chain-man on the construction of the Northern Pacific between Portland, Ore., and Kalama, Wash. He then served successively on location in the Cascade

mountains as a chainman, rodman, levelman and transitman and in 1888 he was advanced to assistant engineer, first in charge of masonry lining of the Stampede tunnel and then of bridge filling on the Pacific division. From 1898 to 1902, he served as assistant engineer in charge of branch-line construction in Montana, Idaho and Washington, and dock construction at Seattle, Wash. In April, 1902, Mr. Gibson was promoted to superintendent of the Yellowstone division; in



Andrew Gibson

April, 1905, he was transferred to the Rocky Mountain division, and in August, 1907, he was promoted to superintendent of timber preservation and tie-treating plants. From June, 1911, to May, 1917, he was engineer maintenance of way of the lines east of Paradise, Mont., being reappointed superintendent of timber-preservation and tie-treating plants in May, 1917.

Mechanical

H. E. May, general boiler foreman on the Illinois Central at Paducah, Ky., has been promoted to general locomotive and boiler inspector, with headquarters at Chicago.

Through a reorganization which is being undertaken in the supervisory positions on the National of Mexico, the following officers, who held the titles of assistant superintendent on the divisions indicated, have been transferred to the mechanical department: **M. Santa**, Chihuahua division; **L. Veron**, Torreon division; **J. M. Borrego**, Durango division; **P. Ortegon**, Monclova division; **F. C. Rosales**, Norte division; **V. Garza**, Golfo division; **A. Garduno C.**, Cardenas division; **R. Fernandez**, San Luis division; **E. King**, Aguascalientes division; **S. Aginlar**, Guadalajara division; **A. C. Ravelo**, Pacific division; **A. Prince** and **M. C. Abasta**, Mexico-Queretaro division; **D. Encinas**, National of Tehuantepec and Pan-American divisions; **E. R. Huerta**, Puebla division; **V. I. Mayme**, Jalapa division, and **I. R. Canedo**, Oaxaca division. Most of these officers

have been appointed road foremen of engines.

Purchases and Stores

The title of **H. T. Shanks**, purchasing agent of the Louisville & Nashville, has been changed to general purchasing agent with headquarters as before at Louisville, Ky.

The headquarters of **W. F. Wright**, purchasing agent of the Louisiana & Arkansas Lines, have been moved from Shreveport, La., to Minden. **F. G. Murray** has been appointed storekeeper at Minden.

Following the death of **W. R. Collins**, manager of purchases of the Erie, on June 28, that position has been abolished and **F. E. Driscoll**, purchaser, has been appointed purchasing agent, **F. W. Holt**, purchaser, has been appointed assistant purchasing agent, and **T. E. Savage**, assistant to manager of purchases, has been appointed assistant purchasing agent. These officers will all have headquarters at New York.

Obituary

William S. Farnsworth, general agent for the Atchison, Topeka & Santa Fe at Mexico, D. F., died at the Santa Fe hospital at Los Angeles, Cal., on July 10.

Joseph P. Church, superintendent of telegraph of the Wabash, with headquarters at Decatur, Ill., died on June 17. Mr. Church had been in the service of the Wabash and the Western Union for nearly 60 years and had planned to retire from active duty on July 1. He was born at Toledo, Ohio, on December 13, 1856, and gained his first telegraph experience as a messenger and delivery clerk for the Western Union Telegraph Company on July 5, 1870. Later he was successively operator, assistant chief operator and electrician for the Western Union, entering railway service on January 1, 1893, as manager of the telegraph office of the Wabash at Decatur. Five years later he was appointed chief clerk to the superintendent of telegraph of the Wabash and on May 1, 1912, Mr. Church was promoted to superintendent of telegraph of that road.

J. M. Rodgers, general auditor of the Norfolk & Western, who died on June 1, as announced in the *Railway Age* of July 5, page 45, was born in Philadelphia, Pa., on June 29, 1870. He was educated at Randolph-Macon College at Ashland, Va., and at business college in Philadelphia. He became connected with the Norfolk & Western, in yard service at Shenandoah, Va., on February 1, 1891, and was promoted to timekeeper, Shenandoah division, at Roanoke, Va., in July, 1893. Four years later, in March, 1897, he was appointed maintenance of way clerk, same division,

returning to the transportation department in March, 1899, as clerk and stenographer in the vice-president's office. In July of the same year he became statistical clerk in the general manager's office and was transferred in the same capacity to the president's office in March, 1904. Mr. Rodgers was appointed statistician in January, 1907. Actually, he continued in this capacity until May 1, 1924, when he was promoted to general auditor. However, in April, 1913, he was made a member of the Valuation Committee, and from January, 1918, to March, 1920, during the period of government operation, Mr. Rodgers performed the duties of statistician under the federal manager. When the railroads were returned to private operation, he continued to act in the capacity of statistician in the operating department. On the retirement of the auditor of receipts, and the consequent dividing of the work formerly handled by his office, Mr. Rodgers was given the newly-created position of general auditor, which appointment was made on May 1, 1924. He held this position until his death.

Willard R. Collins, manager of purchases of the Erie, who died on June 28, at Newark, N. J., as announced in the *Railway Age* of July 5, page 46, was born at Alfred, N. Y., on March 4, 1863. He commenced his railway career in 1875, with the Chicago, Milwaukee & St. Paul (now C., M., St. P. & P.), and in 1887 he entered the service of the Minneapolis, St. Paul & Sault Ste. Marie, as a trainman. He was later appointed chief clerk to the gen-



Willard R. Collins

eral superintendent and then became claim agent and freight claim agent. In 1899 he became connected with the Bradley Watkins Company at Baltimore, Md., and New York, and continued in their service until 1902, when he accepted the position of assistant purchasing agent of the Erie. He was promoted to purchasing agent on May 1, 1908, and was advanced to manager of purchases, the position he held until his death, on July 1, 1921.